Lenovo 3000 N200
Hardware Maintenance Manual

May 2007

This manual supports:

Lenovo 3000 N200
(MT 0687)

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Hardware Maintenance Manual

Note

Before using this information and the product it supports, be sure to read the general information under "Notices" on page 97.

First Edition (May 2007)

Contents

Introduction

About this manual

This manual contains service and reference information for Lenovo 3000 N200 (MT 0687). Use this manual along with the advanced diagnostic tests to troubleshoot problems.

The manual is divided into sections as follows:

- The common sections provide general information, guidelines, and safety information required in servicing computers.
- The product-specific section includes service, reference, and product-specific parts information.

Important

This manual is intended for trained service personnel who are familiar with Lenovo 3000 products. Use this manual along with the advanced diagnostic tests to troubleshoot problems effectively.

Before servicing a Lenovo 3000 product, be sure to review the safety information under "Safety notices: multilingual translations" on page 5, "Safety information" on page 11, and "Laser compliance statement" on page 15.

Important service information

Important

BIOS and device driver fixes are customer-installable. The BIOS and device drivers are posted on the customer support site `http://www.lenovo.com/support`

Advise customers to contact the Customer Support Center at 800-426-7378 if they need assistance in obtaining or installing any software fixes, drivers, and BIOS downloads.

Customers in Canada should call the Customer Support Center at 800-565-3344 for assistance or download information.

Strategy for replacing FRUs

Before replacing parts

Make sure that all software fixes, drivers, and BIOS downloads are installed before replacing any FRUs listed in this manual.

Use the following strategy to prevent unnecessary expense for replacing and servicing FRUs:

- **If you are instructed to replace a FRU but the replacement does not correct the problem, reinstall the original FRU before you continue**.
- Some computers have both a processor board and a system board. If you are instructed to replace either the processor board or the system board, and replacing one of them does not correct the problem, reinstall that board, and then replace the other one.
- If an adapter or a device consists of more than one FRU, any of the FRUs may be the cause of the error. Before replacing the adapter or device, remove the FRUs, one by one, to see if the symptoms change. Replace only the FRU that changed the symptoms.

Attention: The setup configuration on the computer you are servicing may have been customized. Running Automatic Configuration may alter the settings. Note the current configuration settings (using the View Configuration option); then, when service has been completed, verify that those settings remain in effect.

Strategy for replacing a hard disk drive

Always try to run a low-level format before replacing a hard disk drive.

Attention: The drive startup sequence in the computer you are servicing may have been changed. Be extremely careful during write operations such as copying, saving, or formatting. If you select an incorrect drive, data or programs can be overwritten.

Important notice for replacing a system board

Some components mounted on a system board are very sensitive. Improper handling of a system board can cause damage to those components, and may cause a system malfunction.

Attention: When handling a system board:

- Do not drop a system board or apply any excessive force to it.
- Avoid rough handling of any kind.
- Avoid bending a system board and hard pushing to prevent cracking at each BGA (Ball Grid Array) chipset.

How to use error messages

Use the error codes displayed on the screen to diagnose failures. If more than one error code is displayed, begin the diagnosis with the first error code. Whatever causes the first error code may also cause false error codes. If no error code is displayed, see whether the error symptom is listed in the Symptom-to-FRU Index for the computer you are servicing.

Strategy for replacing FRUs for Custom Model Variant (CMV) products

Custom Model Variant (CMV) is a unique configuration that has been negotiated between Lenovo™ and the customer. A unique 4-digit MT and 3-digit model is provided to the customer to place orders (Example: 1829-W15). A CMV is a special bid offering. Therefore, it is NOT generally announced.

There are three information resources to identify which FRUs are used to support CMV products. These sources are PC Entitlement Warehouse (PEW), eSupport, and the HMM.

Using PC Entitlement Warehouse (PEW)

- **PEW** is the primary source for identifying FRU part numbers and FRU descriptions for the key commodities for CMV products at a MT - serial number level. An example of key commodities are hard disk drives, system boards, microprocessors, Liquid Crystal Displays (LCDs), and memory.
- Remember, all CMV products are loaded in PEW under the 4-digit MT and 3-digit model, where model = “fixed part number”.
- PEW can be accessed at the following Web site:
  `http://w3-3.ibm.com/pc/entitle`

  Customers can also access PEW via
  `http://www-307.ibm.com/pc/support/site.wss/product.do?template=/warranty/warranty.vm&sitestyle=lenovo`
  Click on MACHINE LOOKUP, followed by WARRANTY INFORMATION. Input the MT and the Serial number and the list of key commodities will be returned in the PEW record under COMPONENT INFORMATION.
- **Business Partners** using Eclaim will access PEW when performing Entitlement Lookup. Business Partners will enter Loc ID, MT and Serial, and the key commodities will be returned in the Eclaim record under SYSTEM DETAILS.
- Authorized IBM® Business Partners can access Eclaim at the following Web site:
  `https://wca.eclaim.com`

Using eSupport

For Key Commodities (Examples - hard disk drive, system board, microprocessor, LCD, and memory)

- eSupport can be used to view the list of key commodities built in a particular machine serial (this is the same record found in PEW).
- eSupport can be accessed at the following Web site: `http://www.lenovo.com/support`
- To view the key commodities, click on PARTS INFORMATION, then PARTS LOOKUP. Type in the model type and serial number. The key commodities will be returned in the eSupport record under PARTS SHIPPED WITH YOUR SYSTEM.

For the Remaining FRUs (the complete list of FRUs at the MT Model level)

- eSupport can be used to view the complete list of FRUs for a machine type and model.
- To view the complete list of FRUs, type in the machine type and model (Example: 1829-CTO) under QUICK PATH. Under “View by Document Type” select PARTS INFORMATION. Under “Filter by Category” select SERVICE PARTS. Under “Parts Information by Date” select SYSTEM SERVICE PARTS. The list of service parts by description, with applicable machine type model and FRU will be displayed.

Using the HMM

Use the HMM as a back-up to PEW and eSupport to view the complete list of FRUs at the MT Model level. CMVs are custom models and are not found in the HMM.

Important information about replacing RoHS compliant FRUs

RoHS, The Restriction of Hazardous Substances in Electrical and Electronic Equipment Directive (2002/95/EC) is a European Union legal requirement affecting the global electronics industry. RoHS requirements must be implemented on Lenovo products placed on the market after June 2006. Products on the market before June 2006 are not required to have RoHS compliant parts. So, if the original FRU parts are non compliant, replacement parts can also be non compliant. In all cases if the original FRU parts are RoHS compliant the replacement part must also be RoHS compliant.

Lenovo plans to transition to RoHS compliance well before the implementation date and expects its suppliers to be ready to support Lenovo's requirements and schedule. Products sold in 2005, will contain some RoHS compliant FRUs. The following statement pertains to these products and any product Lenovo produces containing RoHS compliant FRUs.

RoHS compliant FRUs have unique FRU part numbers. Before or after the RoHS implementation date, failed RoHS compliant parts must always be replaced using RoHS compliant FRUs, so only the FRUs identified as compliant in the system HMM or direct substitutions for those FRUs may be used.

Products marketed before June 2006		**Products marketed after June 2006**	
Current or original part	**Replacement FRU**	**Current or original part**	**Replacement FRU**
Non-RoHS	Can be Non-RoHS	Must be RoHS	Must be RoHS
Non-RoHS	Can be RoHS		
Non-RoHS	Can sub to RoHS		
RoHS	Must be RoHS		

Note: A direct substitution is a part with a different FRU part number that is automatically shipped by the distribution center at the time of the order.

Diskette compatibility matrix

The compatibility of each of the drives with the diskettes for it is as follows:

Diskette drive	Diskette capacity	Compatibility
3.5-inch	1.0 MB	Read and write
	2.0 MB	Read and write
	4.0 MB	Not compatible

Safety notices: multilingual translations

In this manual, safety notices appear in English with a page number reference to the appropriate multilingual, translated safety notice found in this section.

The following safety notices are provided in English, French, German, Hebrew, Italian, and Spanish.

Safety notice 1

Before the computer is powered on after FRU replacement, make sure all screws, springs, and other small parts are in place and are not left loose inside the computer. Verify this by shaking the computer and listening for rattling sounds. Metallic parts or metal flakes can cause electrical shorts.

Avant de remettre l'ordinateur sous tension après remplacement d'une unité en clientèle, vérifiez que tous les ressorts, vis et autres pièces sont bien en place et bien fixées. Pour ce faire, secouez l'unité et assurez-vous qu'aucun bruit suspect ne se produit. Des pièces métalliques ou des copeaux de métal pourraient causer un court-circuit.

Bevor nach einem FRU-Austausch der Computer wieder angeschlossen wird, muß sichergestellt werden, daß keine Schrauben, Federn oder andere Kleinteile fehlen oder im Gehäuse vergessen wurden. Der Computer muß geschüttelt und auf Klappergeräusche geprüft werden. Metallteile oder-splitter können Kurzschlüsse erzeugen.

לפני הפעלת המחשב לאחר החלפת FRU יש לוודא
שכל הברגים, הקפיצים, וחלקים קטנים אחרים נמצאים
במקומם ואינם חופשיים לזוז בתוך המחשב. כדי לוודא
זאת, יש לטלטל את המחשב ולהקשיב לגילוי קולות שקשוק.
חלקי או שבבי מתכת עלולים לגרום לקצרים חשמליים.

Prima di accendere l'elaboratore dopo che é stata effettuata la sostituzione di una FRU, accertarsi che tutte le viti, le molle e tutte le altri parti di piccole dimensioni siano nella corretta posizione e non siano sparse all'interno dell'elaboratore. Verificare ciò scuotendo l'elaboratore e prestando attenzione ad eventuali rumori; eventuali parti o pezzetti metallici possono provocare cortocircuiti pericolosi.

Antes de encender el sistema despues de sustituir una FRU, compruebe que todos los tornillos, muelles y demás piezas pequeñas se encuentran en su sitio y no se encuentran sueltas dentro del sistema. Compruébelo agitando el sistema y escuchando los posibles ruidos que provocarían. Las piezas metálicas pueden causar cortocircuitos eléctricos.

Safety notice 2

⚠ **DANGER**

Some standby batteries contain a small amount of nickel and cadmium. Do not disassemble a standby battery, recharge it, throw it into fire or water, or short-circuit it. Dispose of the battery as required by local ordinances or regulations. Use only the battery in the appropriate parts listing. Use of an incorrect battery can result in ignition or explosion of the battery.

Certaines batteries de secours contiennent du nickel et du cadmium. Ne les démontez pas, ne les rechargez pas, ne les exposez ni au feu ni à l'eau. Ne les mettez pas en court-circuit. Pour les mettre au rebut, conformez-vous à la réglementation en vigueur. Lorsque vous remplacez la pile de sauvegarde ou celle de l'horloge temps réel, veillez à n'utiliser que les modèles cités dans la liste de pièces détachées adéquate. Une batterie ou une pile inappropriée risque de prendre feu ou d'exploser.

Die Bereitschaftsbatterie, die sich unter dem Diskettenlaufwerk befindet, kann geringe Mengen Nickel und Cadmium enthalten. Sie darf nur durch die Verkaufsstelle oder den IBM Kundendienst ausgetauscht werden. Sie darf nicht zerlegt, wiederaufgeladen, kurzgeschlossen, oder Feuer oder Wasser ausgesetzt werden. Die Batterie kann schwere Verbrennungen oder Verätzungen verursachen. Bei der Entsorgung die örtlichen Bestimmungen für Sondermüll beachten. Beim Ersetzen der Bereitschafts-oder Systembatterie nur Batterien des Typs verwenden, der in der Ersatzteilliste aufgeführt ist. Der Einsatz falscher Batterien kann zu Entzündung oder Explosion führen.

סוללות המתנה מסוימות מכילות כמות קטנה של ניקל וקדמיום. אין לפרק סוללת המתנה, לטעון אותה מחדש, להשליך אותה לאש או למים או לקצר אותה. יש לסלק את הסוללה כנדרש על ידי התקנות והחוקים המקומיים. יש להשתמש רק בסוללה המופיעה ברשימת החלקים המתאימה. שימוש בסוללה לא מתאימה עלול לגרום להצתה או התפוצצות של הסוללה.

Alcune batterie di riserva contengono una piccola quantità di nichel e cadmio. Non smontarle, ricaricarle, gettarle nel fuoco o nell'acqua né cortocircuitarle. Smaltirle secondo la normativa in vigore (DPR 915/82, successive disposizioni e disposizioni locali). Quando si sostituisce la batteria dell'RTC (real time clock) o la batteria di supporto, utilizzare soltanto i tipi inseriti nell'appropriato Catalogo parti. L'impiego di una batteria non adatta potrebbe determinare l'incendio o l'esplosione della batteria stessa.

Algunas baterías de reserva contienen una pequeña cantidad de níquel y cadmio. No las desmonte, ni recargue, ni las eche al fuego o al agua ni las cortocircuite. Deséchelas tal como dispone la normativa local. Utilice sólo baterías que se encuentren en la lista de piezas. La utilización de una batería no apropiada puede provocar la ignición o explosión de la misma.

Safety notice 3

⚠ **DANGER**

The battery pack contains small amounts of nickel. Do not disassemble it, throw it into fire or water, or short-circuit it. Dispose of the battery pack as required by local ordinances or regulations. Use only the battery in the appropriate parts listing when replacing the battery pack. Use of an incorrect battery can result in ignition or explosion of the battery.

La batterie contient du nickel. Ne la démontez pas, ne l'exposez ni au feu ni à l'eau. Ne la mettez pas en court-circuit. Pour la mettre au rebut, conformez-vous à la réglementation en vigueur. Lorsque vous remplacez la batterie, veillez à n'utiliser que les modèles cités dans la liste de pièces détachées adéquate. En effet, une batterie inappropriée risque de prendre feu ou d'exploser.

Akkus enthalten geringe Mengen von Nickel. Sie dürfen nicht zerlegt, wiederaufgeladen, kurzgeschlossen, oder Feuer oder Wasser ausgesetzt werden. Bei der Entsorgung die örtlichen Bestimmungen für Sondermüll beachten. Beim Ersetzen der Batterie nur Batterien des Typs verwenden, der in der Ersatzteilliste aufgeführt ist. Der Einsatz falscher Batterien kann zu Entzündung oder Explosion führen.

מארז הסוללה מכיל כמות קטנה של ניקל וקדמיום. אין לפרק את מארז הסוללה, להשליך אותו לאש או למים או לקצר אותו. יש לסלק את מארז הסוללה הסוללה כנדרש על ידי התקנות והחוקים המקומיים. יש להשתמש רק בסוללה המופיעה ברשימת החלקים המתאימה בזמן החלפת מארז הסוללה. שימוש בסוללה לא מתאימה עלול לגרום להצתה או התפוצצות של הסוללה.

La batteria contiene piccole quantità di nichel. Non smontarla, gettarla nel fuoco o nell'acqua né cortocircuitarla. Smaltirla secondo la normativa in vigore (DPR 915/82, successive disposizioni e disposizioni locali). Quando si sostituisce la batteria, utilizzare soltanto i tipi inseriti nell'appropriato Catalogo parti. L'impiego di una batteria non adatta potrebbe determinare l'incendio o l'esplosione della batteria stessa.

Las baterías contienen pequeñas cantidades de níquel. No las desmonte, ni recargue, ni las eche al fuego o al agua ni las cortocircuite. Deséchelas tal como dispone la normativa local. Utilice sólo baterías que se encuentren en la lista de piezas al sustituir la batería. La utilización de una batería no apropiada puede provocar la ignición o explosión de la misma.

Safety notice 4

⚠ **DANGER**

The lithium battery can cause a fire, an explosion, or a severe burn. Do not recharge it, remove its polarized connector, disassemble it, heat it above 100°C (212°F), incinerate it, or expose its cell contents to water. Dispose of the battery as required by local ordinances or regulations. Use only the battery in the appropriate parts listing. Use of an incorrect battery can result in ignition or explosion of the battery.

La pile de sauvegarde contient du lithium. Elle présente des risques d'incendie, d'explosion ou de brûlures graves. Ne la rechargez pas, ne retirez pas son connecteur polarisé et ne la démontez pas. Ne l'exposez pas à une temperature supérieure à 100°C, ne la faites pas brûler et n'en exposez pas le contenu à l'eau. Mettez la pile au rebut conformément à la réglementation en vigueur. Une pile inappropriée risque de prendre feu ou d'exploser.

Die Systembatterie ist eine Lithiumbatterie. Sie kann sich entzünden, explodieren oder schwere Verbrennungen hervorrufen. Batterien dieses Typs dürfen nicht aufgeladen, zerlegt, über 100 C erhitzt oder verbrannt werden. Auch darf ihr Inhalt nicht mit Wasser in Verbindung gebracht oder der zur richtigen Polung angebrachte Verbindungsstecker entfernt werden. Bei der Entsorgung die örtlichen Bestimmungen für Sondermüll beachten. Beim Ersetzen der Batterie nur Batterien des Typs verwenden, der in der Ersatzteilliste aufgeführt ist. Der Einsatz falscher Batterien kann zu Entzündung oder Explosion führen.

סוללת הליתיום עלולה לגרום לשריפה, להתפוצצות או לכוויות קשות. אין לטעון אותה מחדש, לסלק את המחבר המקוטב שלה, לפרק אותה או לחמם אותה לטמפרטורה העולה על 100 מעלות צלזיוס. אין לשרוף את הסוללה ואין לחשוף את תוכן התא למים. יש לסלק את הסוללה כנדרש בתקנות ובחוקים המקומיים. יש להשתמש רק בסוללה המופיעה ברשימת החלקים המתאימים. שימוש בסוללה אחרת עלול לגרום לסכנת שריפה או התפוצצות.

La batteria di supporto e una batteria al litio e puo incendiarsi, esplodere o procurare gravi ustioni. Evitare di ricaricarla, smontarne il connettore polarizzato, smontarla, riscaldarla ad una temperatura superiore ai 100 gradi centigradi, incendiarla o gettarla in acqua. Smaltirla secondo la normativa in vigore (DPR 915/82, successive disposizioni e disposizioni locali). L'impiego di una batteria non adatta potrebbe determinare l'incendio o l'esplosione della batteria stessa.

La batería de repuesto es una batería de litio y puede provocar incendios, explosiones o quemaduras graves. No la recargue, ni quite el conector polarizado, ni la desmonte, ni caliente por encima de los 100°C (212°F), ni la incinere ni exponga el contenido de sus celdas al agua. Deséchela tal como dispone la normativa local.

Safety notice 5

If the LCD breaks and the fluid from inside the LCD gets into your eyes or on your hands, immediately wash the affected areas with water for at least 15 minutes. Seek medical care if any symptoms from the fluid are present after washing.

Si le panneau d'affichage à cristaux liquides se brise et que vous recevez dans les yeux ou sur les mains une partie du fluide, rincez-les abondamment pendant au moins quinze minutes. Consultez un médecin si des symptômes persistent après le lavage.

Die Leuchtstoffröhre im LCD-Bildschirm enthält Quecksilber. Bei der Entsorgung die örtlichen Bestimmungen für Sondermüll beachten. Der LCD-Bildschirm besteht aus Glas und kann zerbrechen, wenn er unsachgemäß behandelt wird oder der Computer auf den Boden fällt. Wenn der Bildschirm beschädigt ist und die darin befindliche Flüssigkeit in Kontakt mit Haut und Augen gerät, sollten die betroffenen Stellen mindestens 15 Minuten mit Wasser abgespült und bei Beschwerden anschließend ein Arzt aufgesucht werden.

אם מסך הגביש הנוזלי (LCD) נשבר והנוזל מתוך המסך בא במגע עם עיניכם או ידיכם, שטפו את האזורים הנגועים מיד במים במשך 15 דקות לפחות. פנו לקבלת עזרה רפואית אם תסמינים הנובעים מהמגע עם הנוזל נמשכים לאחר השטיפה.

Nel caso che caso l'LCD si dovesse rompere ed il liquido in esso contenuto entrasse in contatto con gli occhi o le mani, lavare immediatamente le parti interessate con acqua corrente per almeno 15 minuti; poi consultare un medico se i sintomi dovessero permanere.

Si la LCD se rompe y el fluido de su interior entra en contacto con sus ojos o sus manos, lave inmediatamente las áreas afectadas con agua durante 15 minutos como mínimo. Obtenga atención medica si se presenta algún síntoma del fluido despues de lavarse.

Safety notice 6

⚠ **DANGER**

To avoid shock, do not remove the plastic cover that protects the lower part of the inverter card.

Afin d'éviter tout risque de choc électrique, ne retirez pas le cache en plastique protégeant la partie inférieure de la carte d'alimentation.

Aus Sicherheitsgründen die Kunststoffabdeckung, die den unteren Teil der Spannungswandlerplatine umgibt, nicht entfernen.

כדי למנוע התחשמלות, אין להסיר את מכסה הפלסטיק המגן על חלקו התחתון של הכרטיס ההפוך.

Per evitare scosse elettriche, non rimuovere la copertura in plastica che avvolge la parte inferiore della scheda invertitore.

Para evitar descargas, no quite la cubierta de plástico que rodea la parte baja de la tarjeta invertida.

Safety notice 7

⚠ **DANGER**

Though the main batteries have low voltage, a shorted or grounded battery can produce enough current to burn personnel or combustible materials.

Bien que le voltage des batteries principales soit peu élevé, le court-circuit ou la mise à la masse d’une batterie peut produire suffisamment de courant pour brûler des matériaux combustibles ou causer des brûlures corporelles graves.

Obwohl Hauptbatterien eine niedrige Spannung haben, können sie doch bei Kurzschluß oder Erdung genug Strom abgeben, um brennbare Materialien zu entzünden oder Verletzungen bei Personen hervorzurufen.

**אף שהסוללות הראשיות הן בעלות מתח נמוך, סוללה
מקוצרת או מוארקת עלולה להפיק זרם מספיק לגרימת
כוויות או להצתת חומרים דליקים.**

Sebbene le batterie di alimentazione siano a basso voltaggio, una batteria in corto circuito o a massa può fornire corrente sufficiente da bruciare materiali combustibili o provocare ustioni ai tecnici di manutenzione.

Aunque las baterías principales tienen un voltaje bajo, una batería cortocircuitada o con contacto a tierra puede producir la corriente suficiente como para quemar material combustible o provocar quemaduras en el personal.

Safety notice 8

⚠ **DANGER**

Before removing any FRU, power off the computer, unplug all power cords from electrical outlets, remove the battery pack, and then disconnect any interconnecting cables.

Avant de retirer une unité remplaçable en clientèle, mettez le système hors tension, débranchez tous les cordons d’alimentation des socles de prise de courant, retirez la batterie et déconnectez tous les cordons d’interface.

Die Stromzufuhr muß abgeschaltet, alle Stromkabel aus der Steckdose gezogen, der Akku entfernt und alle Verbindungskabel abgenommen sein, bevor eine FRU entfernt wird.

**לפני סילוק FRU כלשהו, יש לכבות את המחשב,
לנתק את כל כבלי החשמל משקעי החשמל, להוציא
את מארז הסוללה, ואז לנתק כבלי חיבור אחרים
אם יש כאלה.**

Prima di rimuovere qualsiasi FRU, spegnere il sistema, scollegare dalle prese elettriche tutti i cavi di alimentazione, rimuovere la batteria e poi scollegare i cavi di interconnessione.

Antes de quitar una FRU, apague el sistema, desenchufe todos los cables de las tomas de corriente eléctrica, quite la batería y, a continuación, desconecte cualquier cable de conexión entre dispositivos.

Safety information

The following section presents safety information with which you need to be familiar before you service a Lenovo 3000 computer.

General safety

Follow these rules to ensure general safety:

- Observe good housekeeping in the area of the machines during and after maintenance.
- When lifting any heavy object:
  1. Make sure that you can stand safely without slipping.
  2. Distribute the weight of the object equally between your feet.
  3. Use a slow lifting force. Never move suddenly or twist when you attempt to lift.
  4. Lift by standing or by pushing up with your leg muscles; this action removes the strain from the muscles in your back. *Do not attempt to lift any object that weighs more than 16 kg (35 lb) or that you think is too heavy for you.*
- Do not perform any action that causes hazards to the customer, or that makes the equipment unsafe.
- Before you start the machine, make sure that other service representatives and the customer's personnel are not in a hazardous position.
- Place removed covers and other parts in a safe place, away from all personnel, while you are servicing the machine.
- Keep your toolcase away from walk areas so that other people will not trip over it.
- Do not wear loose clothing that can be trapped in the moving parts of a machine. Make sure that your sleeves are fastened or rolled up above your elbows. If your hair is long, fasten it.
- Insert the ends of your necktie or scarf inside clothing or fasten it with a nonconductive clip, about 8 centimeters (3 inches) from the end.
- Do not wear jewelry, chains, metal-frame eyeglasses, or metal fasteners for your clothing.

  Attention: Metal objects are good electrical conductors.
- Wear safety glasses when you are hammering, drilling, soldering, cutting wire, attaching springs, using solvents, or working in any other conditions that might be hazardous to your eyes.
- After service, reinstall all safety shields, guards, labels, and ground wires. Replace any safety device that is worn or defective.
- Reinstall all covers correctly before returning the machine to the customer.
- Fan louvers on the machine help to prevent overheating of internal components. Do not obstruct fan louvers or cover them with labels or stickers.

Electrical safety

Observe the following rules when working on electrical equipment.

Important

Use only approved tools and test equipment. Some hand tools have handles covered with a soft material that does not insulate you when working with live electrical currents.

Many customers have, near their equipment, rubber floor mats that contain small conductive fibers to decrease electrostatic discharges. Do not use this type of mat to protect yourself from electrical shock.

- Find the room emergency power-off (EPO) switch, disconnecting switch, or electrical outlet. If an electrical accident occurs, you can then operate the switch or unplug the power cord quickly.
- Do not work alone under hazardous conditions or near equipment that has hazardous voltages.
- Disconnect all power before:
  - Performing a mechanical inspection
  - Working near power supplies
  - Removing or installing main units
- Before you start to work on the machine, unplug the power cord. If you cannot unplug it, ask the customer to power-off the wall box that supplies power to the machine, and to lock the wall box in the off position.
- If you need to work on a machine that has *exposed* electrical circuits, observe the following precautions:
  - Ensure that another person, familiar with the power-off controls, is near you.

    Attention: Another person must be there to switch off the power, if necessary.
  - Use only one hand when working with powered-on electrical equipment; keep the other hand in your pocket or behind your back.

    Attention: An electrical shock can occur only when there is a complete circuit. By observing the above rule, you may prevent a current from passing through your body.
  - When using testers, set the controls correctly and use the approved probe leads and accessories for that tester.
  - Stand on suitable rubber mats (obtained locally, if necessary) to insulate you from grounds such as metal floor strips and machine frames.

  Observe the special safety precautions when you work with very high voltages; Instructions for these precautions are in the safety sections of maintenance information. Use extreme care when measuring high voltages.
- Regularly inspect and maintain your electrical hand tools for safe operational condition.
- Do not use worn or broken tools and testers.
- *Never assume* that power has been disconnected from a circuit. First, *check* that it has been powered off.
- Always look carefully for possible hazards in your work area. Examples of these hazards are moist floors, nongrounded power extension cables, power surges, and missing safety grounds.
- Do not touch live electrical circuits with the reflective surface of a plastic dental mirror. The surface is conductive; such touching can cause personal injury and machine damage.

- Do not service the following parts *with the power on* when they are removed from their normal operating places in a machine:
  - Power supply units
  - Pumps
  - Blowers and fans
  - Motor generators

  and similar units. (This practice ensures correct grounding of the units.)
- If an electrical accident occurs:
  - Use caution; do not become a victim yourself.
  - Switch off power.
  - Send another person to get medical aid.

Safety inspection guide

The purpose of this inspection guide is to assist you in identifying potentially unsafe conditions. As each machine was designed and built, required safety items were installed to protect users and service personnel from injury. This guide addresses only those items. You should use good judgment to identify potential safety hazards due to attachment of non-Lenovo 3000 features or options not covered by this inspection guide.

If any unsafe conditions are present, you must determine how serious the apparent hazard could be and whether you can continue without first correcting the problem.

Consider these conditions and the safety hazards they present:
- Electrical hazards, especially primary power (primary voltage on the frame can cause serious or fatal electrical shock)
- Explosive hazards, such as a damaged CRT face or a bulging capacitor
- Mechanical hazards, such as loose or missing hardware

To determine whether there are any potentially unsafe conditions, use the following checklist at the beginning of every service task. Begin the checks with the power off, and the power cord disconnected.

Checklist:
1. Check exterior covers for damage (loose, broken, or sharp edges).
2. Power off the computer. Disconnect the power cord.
3. Check the power cord for:
   a. A third-wire ground connector in good condition. Use a meter to measure third-wire ground continuity for 0.1 ohm or less between the external ground pin and the frame ground.
   b. The power cord should be the type specified in the parts list.
   c. Insulation must not be frayed or worn.
4. Remove the cover.
5. Check for any obvious non-Lenovo 3000 alterations. Use good judgment as to the safety of any non-Lenovo 3000 alterations.
6. Check inside the unit for any obvious unsafe conditions, such as metal filings, contamination, water or other liquids, or signs of fire or smoke damage.
7. Check for worn, frayed, or pinched cables.
8. Check that the power-supply cover fasteners (screws or rivets) have not been removed or tampered with.

Handling devices that are sensitive to electrostatic discharge

Any computer part containing transistors or integrated circuits (ICs) should be considered sensitive to electrostatic discharge (ESD.) ESD damage can occur when there is a difference in charge between objects. Protect against ESD damage by equalizing the charge so that the machine, the part, the work mat, and the person handling the part are all at the same charge.

Notes

1. Use product-specific ESD procedures when they exceed the requirements noted here.
2. Make sure that the ESD protective devices you use have been certified (ISO 9000) as fully effective.

When handling ESD-sensitive parts:

- Keep the parts in protective packages until they are inserted into the product.
- Avoid contact with other people.
- Wear a grounded wrist strap against your skin to eliminate static on your body.
- Prevent the part from touching your clothing. Most clothing is insulative and retains a charge even when you are wearing a wrist strap.
- Use the black side of a grounded work mat to provide a static-free work surface. The mat is especially useful when handling ESD-sensitive devices.
- Select a grounding system, such as those listed below, to provide protection that meets the specific service requirement.

  Note

  The use of a grounding system to guard against ESD damage is desirable but not necessary.

  - Attach the ESD ground clip to any frame ground, ground braid, or green-wire ground.
  - When working on a double-insulated or battery-operated system, use an ESD common ground or reference point. You can use coax or connector-outside shells on these systems.
  - Use the round ground prong of the ac plug on ac-operated computers.

Grounding requirements

Electrical grounding of the computer is required for operator safety and correct system function. Proper grounding of the electrical outlet can be verified by a certified electrician.

Laser compliance statement

Some models of Lenovo 3000 computer are equipped from the factory with an optical storage device such as a CD-ROM drive or a DVD-ROM drive. Such devices are also sold separately as options. If one of these drives is installed, it is certified in the U.S. to conform to the requirements of the Department of Health and Human Services 21 Code of Federal Regulations (DHHS 21 CFR) Subchapter J for Class 1 laser products. Elsewhere, the drive is certified to conform to the requirements of the International Electrotechnical Commission (IEC) 825 and CENELEC EN 60 825 for Class 1 laser products.

If a CD-ROM drive, a DVD-ROM drive, or another laser device is installed, note the following:

⚠ **CAUTION:**

Use of controls or adjustments or performance of procedures other than those specified herein might result in hazardous radiation exposure.

O uso de controles, ajustes ou desempenho de procedimentos diferentes daqueles aqui especificados pode resultar em perigosa exposição à radiação.

凡未在这里指明的任何控制用法、调整、行为，
都会导致严重后果。

Pour éviter tout risque d'exposition au rayon laser, respectez les consignes de réglage et d'utilisation des commandes, ainsi que les procédures décrites.

Werden Steuer- und Einstellelemente anders als hier festgesetzt verwendet, kann gefährliche Laserstrahlung auftreten.

Az itt előírt eljárásoktól, beállításoktól és vezérlésektől eltérni a lézersugárzás veszélye miatt kockázatos !

L'utilizzo di controlli, regolazioni o l'esecuzione di procedure diverse da quelle specificate possono provocare l'esposizione a.

Использование элементов настройки и выполнение процедур иных, чем указано здесь, может привести к опасному радиационному облучению.

Použitie kontrôl, úprav alebo iných vykonaní od iných výrobcov, ako je v tomto špecifikované, mohlo by mať za následok nebezpečenstvo vystavenia sa vyžiarovaniu.

El uso de controles o ajustes o la ejecución de procedimientos distintos de los aquí especificados puede provocar la exposición a radiaciones peligrosas.

Opening the CD-ROM drive, the DVD-ROM drive, or any other optical storage device could result in exposure to hazardous laser radiation. There are no serviceable parts inside those drives. **Do not open.**

Laser compliance statement

A CD-ROM drive, a DVD-ROM drive, or any other storage device installed may contain an embedded Class 3A or Class 3B laser diode. Note the following:

⚠ **DANGER**

Emits visible and invisible laser radiation when open. Do not stare into the beam, do not view directly with optical instruments, and avoid direct exposure to the beam.

Radiação por raio laser ao abrir. Não olhe fixo no feixe de luz, não olhe diretamente por meio de instrumentos óticos e evite exposição direta com o feixe de luz.

开启时会有激光发射时，请勿盯视激光光束，请勿直接查看
视觉仪器，并且避免直接接触在激光光束之中。

Rayonnement laser si carter ouvert. Évitez de fixer le faisceau, de le regarder directement avec des instruments optiques, ou de vous exposer au rayon.

Laserstrahlung bei geöffnetem Gerät. Nicht direkt oder über optische Instrumente in den Laserstrahl sehen und den Strahlungsbereich meiden.

Kinyitáskor lézersugár ! Ne nézzen bele se szabad szemmel, se optikai eszközökkel. Kerülje a sugárnyalábbal való érintkezést !

Aprendo l'unità vengono emesse radiazioni laser. Non fissare il fascio, non guardarlo direttamente con strumenti ottici e evitare l'esposizione diretta al fascio.

Открывая, берегитесь лазерного излучения.
Не смотрите на луч, не разглядывайте его
с помощью оптических инструментов, а также
избегайте прямого воздействия лазерного луча.

Keď je laserová jednotka otvorená. Vyhnite sa priamemu
pohľadu a nehľadte priamo s optickými nástrojmi do ľúča
a vyhnite sa priamemu vystaveniu ľúčov.

Radiación láser al abrir. No mire fijamente ni examine con instrumental óptico el haz de luz. Evite la exposición directa al haz.

General descriptions

The descriptions in this chapter apply to any Lenovo 3000 model that has the PC-Doctor® for DOS diagnostics program. Some descriptions might not apply to your particular computer.

Read this first

Before you go to the checkout guide, be sure to read this section.

Important notes

- **Only certified trained personnel should service the computer.**
- **Before replacing any FRU, read the entire page on removing and replacing FRUs.**
- **When you replace FRUs, use new nylon-coated screws.**
- **Be extremely careful during such write operations as copying, saving, or formatting.** Drives in the computer that you are servicing sequence might have been altered. If you select an incorrect drive, data or programs might be overwritten.
- **Replace a FRU only with another FRU of the correct model.** When you replace a FRU, make sure that the model of the machine and the FRU part number are correct by referring to the FRU parts list.
- **A FRU should not be replaced because of a single, unreproducible failure.** Single failures can occur for a variety of reasons that have nothing to do with a hardware defect, such as cosmic radiation, electrostatic discharge, or software errors. Consider replacing a FRU only when a problem recurs. If you suspect that a FRU is defective, clear the error log and run the test again. If the error does not recur, do not replace the FRU.
- **Be careful not to replace a nondefective FRU.**

What to do first

When you do return a FRU, you must include the following information in the parts exchange form or parts return form that you attach to it:

__ 1. Name and phone number of servicer
__ 2. Date of service
__ 3. Date on which the machine failed
__ 4. Date of purchase
__ 5. Failure symptoms, error codes appearing on the display
__ 6. Procedure index and page number in which the failing FRU was detected
__ 7. Failing FRU name and part number
__ 8. Machine type, model number, and serial number
__ 9. Customer's name and address

Note for warranty:
During the warranty period, the customer may be responsible for repair costs if the computer damage was caused by misuse, accident, modification, unsuitable physical or operating environment, or improper maintenance by the customer.

Following is a list of some common items that are not covered under warranty and some symptoms that might indicate that the system was subjected to stress beyond normal use.

Before checking problems with the computer, determine whether the damage is covered under the warranty by referring to the following list:

The following are not covered under warranty:
- LCD panel cracked from the application of excessive force or from being dropped
- Scratched (cosmetic) parts
- Distortion, deformation, or discoloration of the cosmetic parts
- Plastic parts, latches, pins, or connectors that have been cracked or broken by excessive force
- Damage caused by liquid spilled into the system
- Damage caused by the improper insertion of a PC Card or the installation of an incompatible card
- Improper disc insertion or use of an optical drive
- Diskette drive damage caused by pressure on the diskette drive cover, foreign material in the drive, or the insertion of a diskette with multiple labels
- Damaged or bent diskette eject button
- Fuses blown by attachment of a nonsupported device
- Forgotten computer password (making the computer unusable)
- Sticky keys caused by spilling a liquid onto the keyboard
- Use of an incorrect ac adapter on laptop products

The following symptoms might indicate damage caused by nonwarranted activities:
- Missing parts might be a symptom of unauthorized service or modification.
- If the spindle of a hard disk drive becomes noisy, it may have been subjected to excessive force, or dropped.

Related service information

This section provides information about the following:
- "Service Web site"
- "Restoring the factory contents by using Product Recovery discs"
- "Passwords" on page 20
- "Power management" on page 22

Service Web site

When the latest maintenance diskette and the system program service diskette become available, they will be posted on `http://www.lenovo.com/spm`

Restoring the factory contents by using Product Recovery discs

When the hard disk drive is replaced because of a failure, no Product Recovery program is on the new hard disk. In this case, you must use the recovery disc for the computer. Order the recovery disc and the hard disk drive at the same time so that you can recover the new hard disk drive with the preinstalled software when they arrive. For information on which disc to order, see "Recovery discs" on page 90.

To install the factory contents by using Product Recovery discs, do the following:

> **Note**
> The recovery process might take up to 2 hours.

1. Make the optical drive the first start up device in the startup sequence.
2. Insert the bootable **Rescue and Recovery™ Startup disc** into the optical drive, and then start the computer.
3. In the Rescue and Recovery workspace, complete the following procedure:
   a. When the Rescue and Recovery workspace opens, click **Continue** on the Welcome window and then click **Restore your system**.
   b. When a message about accessing a USB device is displayed, click **OK**.
   c. In the initial window of the ″Restore your system″ wizard, select **Restore my hard drive to the original factory state** and click **Next**.
   d. In the next window, select **I do not want to save any files** and click **Next**.
   e. A warning opens not to turn off the computer during the recovery process. Click **OK**.
4. When the Product Recovery window opens, click **OK**.
5. The Terms and Conditions window opens, select **I accept these terms and conditions** and then click **OK**.
6. After the files necessary for the product recovery are copied from the Rescue and Recovery Startup disc to the hard drive, the system restarts automatically and boot back into Rescue and Recovery. Remove the disc and turn off the computer.
7. Turn on the computer to continue the recovery process.
8. After you restart the computer, the computer prompts you for a supplemental Rescue and Recovery disc. If you have a supplemental Rescue and Recovery disc, click **OK** and insert the supplemental disc. If you do not have a supplemental disc, click **No**.

9. When prompted, insert the appropriate Product Recovery disc and then click **OK**. The second phase of the recovery process begins.
10. When all of the data has been copied from the last Product Recovery disc in the set, a message is displayed prompting you to restart the computer. Remove the disc and then click **Yes**, then a message is displayed asking you to continue the recovery process. Click **Continue** to restart your computer, then the computer restarts and the third phase of the recovery process begins.
11. When the recovery process is complete, the Welcome to Microsoft® Windows® screen is displayed. Follow the instructions on the screen to complete the Windows setup.

Passwords

As many as three passwords may be needed for any Lenovo 3000 computer: the power-on password (POP), the hard-disk password (HDP), and the supervisor password (SVP).

If any of these passwords has been set, a prompt for it appears on the screen whenever the computer is turned on. The computer does not start until the password is entered.

Exception: If only an SVP is installed, the password prompt does not appear when the operating system is booted.

Power-on password:
A power-on password (POP) protects the system from being powered on by an unauthorized person. The password must be entered before an operating system can be booted.

Hard-disk password:
There are two hard-disk passwords (HDPs):

- User HDP—for the user
- Master HDP—for the system administrator, who can use it to get access to the hard disk even if the user has changed the user HDP

Note: There are two modes for the HDP: **User only** and **Master + User**. The **Master + User** mode requires two HDPs; the system administrator enters both in the same operation. The system administrator then provides the user HDP to the system user.

Attention: If the user HDP has been forgotten, check whether a master HDP has been set. If it has, it can be used for access to the hard disk drive. If no master HDP is available, neither Lenovo nor Lenovo authorized servicers provide any services to reset either the user or the master HDP, or to recover data from the hard disk drive. The hard disk drive can be replaced for a scheduled fee.

Supervisor password:
A supervisor password (SVP) protects the system information stored in the BIOS Setup Utility. The user must enter the SVP in order to get access to the BIOS Setup Utility and change the system configuration.

Attention: If the SVP has been forgotten and cannot be made available to the servicer, there is no service procedure to reset the password. The system board must be replaced for a scheduled fee.

How to remove the power-on password

To remove a POP that you have forgotten, do the following:

(A) If no SVP has been set:

1. Turn off the computer.
2. Remove the battery pack.

   For how to remove the battery pack, see "1010 Battery pack" on page 45.
3. Remove the backup battery.

   For how to remove the backup battery, see "1150 Backup battery" on page 64.
4. Turn on the computer and wait until the POST ends.

   After the POST ends, the password prompt does not appear. The POP has been removed.
5. Reinstall the backup battery and the battery pack.

(B) If an SVP has been set and is known by the servicer:

1. Turn on the computer; then, while the initial screen is displayed, press the Lenovo Care^{SM} button. The Rescue and Recovery screen opens.
2. Click **Access BIOS**. The System Restart Required window is displayed.
3. Click **Yes**. The computer restarts, and the BIOS Setup Utility screen opens.
4. Select **Security**, using the cursor directional keys to move down the menu.
5. Select **Password**.
6. Select **Power-On Password**[*1].
7. Type the current SVP in the **Enter Current Password** field. Then leave the **Enter New Password** field blank, and press Enter twice.
8. In the Changes have been saved window, press Enter.
9. Press F10; then, in the Setup confirmation window, select **Yes** .

Note: For some models, the BIOS menu marked *1 is **User Password**.

How to remove the hard-disk password

Attention: If **User only** mode is selected and the user HDP has been forgotten and cannot be made available to the servicer, neither Lenovo nor Lenovo authorized servicers provide any services to reset the user HDPs or to recover data from the hard disk drive. The hard disk drive can be replaced for a scheduled fee.

To remove a user HDP that has been forgotten, when the SVP and the master HDP are known, do the following:

1. Turn on the computer; then, while the initial screen is displayed, press the Lenovo Care button. The Rescue and Recovery screen opens.
2. Click **Access BIOS**. The System Restart Required window is displayed.
3. Click **Yes**. The computer restarts, and the BIOS Setup Utility screen opens.
4. Select **Security**, using the cursor directional keys to move down the menu.
5. Select **Password**.
6. Select **Hard-disk** *x* **password**, where *x* is the letter of the hard disk drive. A pop-up window opens.
7. Select **Master HDP**.
8. Type the current master HDP in the **Enter Current Password** field. then leave the **Enter New Password** field blank, and press Enter twice.
9. Press F10.

10. Select **Yes** in the Setup Configuration window.

    Both user HDP and master HDP will have been removed.

Power management

Note: Power management modes are not supported for APM operating system.

To reduce power consumption, the computer has three power management modes: screen blank, sleep (standby), and hibernation.

Screen blank mode

If the time set on the "Turn off monitor" timer in the operating system expires, the LCD backlight turns off.

To end screen blank mode and resume normal operation, press any key.

Sleep (standby) mode

When the computer enters sleep (standby) mode, the following events occur in addition to what occurs in screen blank mode:
- The LCD is powered off.
- The hard disk drive is powered off.
- The CPU stops.

To enter sleep (standby) mode, press Fn+F4.

In certain circumstances, the computer goes into sleep (standby) mode automatically:
- If a "suspend time" has been set on the timer, and the user does not do any operation with the keyboard, the hard disk, the parallel connector, or the diskette drive within that time.
- If the battery indicator blinks orange, indicating that the battery power is low. (Alternatively, if **Hibernate when battery becomes low** has been selected in the "Power Management Properties" window, the computer goes into hibernation mode.)

To cause the computer to return from sleep (standby) mode and resume operation, do one of the following:
- Press the Fn key.
- Open the LCD cover.
- Turn on the power switch.

Also, in the following event, the computer automatically returns from sleep (standby) mode and resumes operation:
- The time set on the resume timer elapses.

  Note: The computer does not accept any input immediately after it enters sleep (standby) mode. Wait a few seconds before taking any action to reenter operation mode.

Hibernation mode

In hibernation mode, the following occurs:
- The system status, RAM, VRAM, and setup data are stored on the hard disk.
- The system is powered off.

To cause the computer to enter hibernation mode, do any of the following:

- Press the Fn+F12 keys.
- If you are using the ACPI operating system and have defined one of the following actions as the event that causes the system to go into hibernation mode, perform that action.
  - Closing the lid.
  - Pressing the power button.

Also, the computer goes into hibernation mode automatically in either of the following conditions:

- If a "hibernation time" has been set on the timer, and if the user does not do any operation with the keyboard, the hard disk drive, the parallel connector, or the diskette drive within that time.
- If the timer conditions are satisfied in suspend mode.

When the power is turned on, the computer returns from hibernation mode and resumes operation. The hibernation file in the boot record on the hard disk drive is read, and system status is restored from the hard disk drive.

Checkout guide

Use the following procedures as a guide in identifying and correcting problems with the Lenovo 3000 computer.

Note: The diagnostic tests are intended to test only Lenovo 3000 products. The use of non-Lenovo 3000 products, prototype cards, or modified options can lead to false indications of errors and invalid system responses.

1. Identify the failing symptoms in as much detail as possible.
2. Verify the symptoms. Try to re-create the failure by running the diagnostic test or by repeating the operation.

Testing the computer

The Lenovo 3000 computer has a test program called PC-Doctor for DOS (hereafter called *PC-Doctor*.) You can detect errors by running the diagnostics test included in PC-Doctor. This section is an overview of the procedure. For details that depend on model-unique functions, refer to "Product overview" on page 30.

For some possible configurations of the computer, PC-Doctor might not run correctly. To avoid this problem, you need to initialize the computer setup by use of the BIOS Setup Utility before you run PC-Doctor. On the BIOS Setup Utility screen, press F9, Enter, F10, and then Enter.

Note: When you initialize the computer configuration, some devices are disabled, such as the serial port. If you test one of these devices, you will need to enable it by using Configuration utility for DOS. The utility is available on the following Web site: `http://www.lenovo.com/support`

Creating the PC-Doctor diagnostics diskette

To create the PC-Doctor disk from the Rescue and Recovery workspace , do as follows:

1. Enter the Rescue and Recovery workspace by pressing the Lenovo Care button during POST.
2. When the Rescue and Recovery workspace finishes loading, click **Diagnostic Diskette**.
3. Authenticating the digital signature takes about 15 seconds; then the Lenovo 3000 computer will reboot into PC-DOS.
4. A batch file automatically starts up to prompt you through the process of creating diskettes. You are notified of how many diskettes you will need.
   a. You are prompted to insert each diskette in sequence.
   b. Typically, all you need to do is to press the Enter key for the floppy drive; the system then formats and creates the diskette.
   c. Each diskette is erased and formatted with the PC-Doctor for DOS boot image.
5. Once all the diskettes have been created, the Lenovo 3000 computer will reboot. The user is asked to remove all diskettes from the drive, or to insert the first diskette created if it is desired to run the diagnostics.

To run the test, do as follows:

1. Insert the PC-Doctor disk into the diskette drive; then power on the computer.

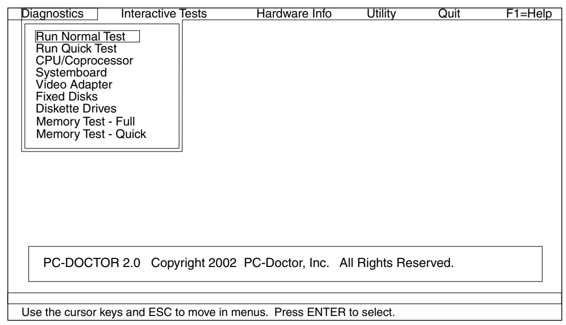
   If the computer cannot be powered on, go to "Power system checkout" on page 26, and check the power sources.

   If an error code appears, go to "Symptom-to-FRU index" on page 35.

   On the first screen, select the model and press Enter. Follow the instructions on the screen.
2. The main panel of PC-Doctor appears.
3. Select **Diagnostics** with the arrow keys, and press Enter.

   A pull-down menu appears. (Its exact form depends on the model.)

   Note: PC-Doctor menu does not mean the formal support device list. Some unsupported device names may appear in the PC-Doctor menu.



The options on the test menu are as follows:

<table>
<tr><th>Diagnostics</th><th>Interactive Tests</th></tr>
<tr><td>• Run Normal Test
• Run Quick Test
• CPU/Coprocessor
• Systemboard
• Video Adapter
• Fixed Disks
• Diskette Drives
• Memory Test – Full
• Memory Test – Quick</td><td>• Keyboard
• Video
• Mouse
• System Load</td></tr>
<tr><td colspan="2">Notes:
• In the Keyboard test in Interactive Tests, the Fn key should be held down with M key for at least 2 seconds; otherwise, it cannot be sensed.
• Video Adapter test supports only the LCD display on the Lenovo 3000 computer. If you have an external monitor attached to your computer, detach it before running PC-Doctor for DOS.</td></tr>
</table>

4. Run the applicable function test.
5. Follow the instructions on the screen. If there is a problem, PC-Doctor shows messages describing it.
6. To exit the test, select **Quit — Exit Diag**.

   To cancel the test, press Esc.

Note: After running PC-Doctor, check the time and date on the system and reset them if they are incorrect.

Detecting system information with PC-Doctor

PC-Doctor can detect the following system information:

Hardware Info

- System Configuration
- Memory Contents
- Physical Disk Drives
- Logical Disk Drives
- VGA Information
- IDE Drive Info
- PCI Information
- PNPISA Info
- SMBIOS Info
- VESA LCD Info
- Hardware Events Log

Utility

- Run External Tests
- Surface Scan Hard Disk
- Benchmark System
- DOS Shell
- Tech Support Form
- Battery Rundown
- View Test Log
- Print Log
- Save Log
- Full Erase Hard Drive
- Quick Erase Hard Drive

PC-Doctor for Windows

This product is designed to help you troubleshoot and resolve problems related to your computer. Select one of the categories listed below to display symptoms and solutions:

- CHECK SYSTEM HEALTH
- SYSTEM AND DEVICE TESTS
- LENOVO TROUBLESHOOTING
- CENTER
- SYSTEM REPORTS
- UPDATES AND SUPPORT

Power system checkout

To verify a symptom, do the following:

1. Turn off the computer.
2. Remove the battery pack.
3. Connect the ac adapter.
4. Check that power is supplied when you turn on the computer.
5. Turn off the computer.
6. Disconnect the ac adapter and install the charged battery pack.
7. Check that the battery pack supplies power when you turn on the computer.

If you suspect a power problem, see the appropriate one of the following power supply checkouts:

- “Checking the ac adapter” on page 27
- “Checking operational charging” on page 27
- “Checking the battery pack” on page 27

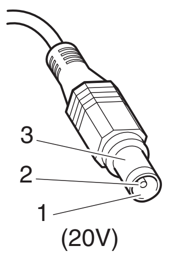
Checking the ac adapter

You are here because the computer fails only when the ac adapter is used.

- If the power-on indicator does not turn on, check the power cord of the ac adapter for correct continuity and installation.
- If the computer does not charge during operation, go to ″Checking operational charging.″

To check the ac adapter, do the following:

1. Unplug the ac adapter cable from the computer.
2. Measure the output voltage at the plug of the ac adapter cable. See the following figure:



Pin	Voltage (V dc)
1	+20
2	0
3	Ground

   Note: Output voltage of pin no.2 of the ac adapter may be different from the one you are servicing.
3. If the voltage is not correct, replace the ac adapter.
4. If the voltage is acceptable, do the following:
   - Replace the system board.
   - If the problem persists, go to “Product overview” on page 30.

Note: Noise from the ac adapter does not always indicate a defect.

Checking operational charging

To check whether the battery charges properly during operation, use a discharged battery pack or a battery pack that has less than 50% of the total power remaining when installed in the computer.

Perform operational charging. If the battery status indicator or icon does not turn on, remove the battery pack and let it return to room temperature. Reinstall the battery pack. If the charge indicator or icon still does not turn on, replace the battery pack.

If the charge indicator still does not turn on, replace the system board. Then reinstall the battery pack. If it is still not charged, go to the next section.

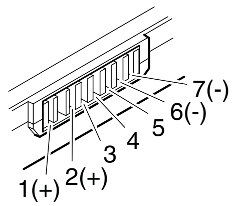
Checking the battery pack

Battery charging does not start until the Power Meter shows that less than 95% of the total power remains; under this condition the battery pack can charge to 100% of its capacity. This protects the battery pack from being overcharged or from having a shortened life.

To check your battery, move your cursor to the Power Meter icon in the icon tray of the Windows taskbar and wait for a moment (but do not click), and the percentage of battery power remaining is displayed. To get detailed information about the battery, double-click the Power Meter icon.

Note: If the battery pack becomes hot, it may not be able to charge. Remove it from the computer and leave it at room temperature for a while. After it cools down, reinstall and recharge it.

To check the battery pack, do the following:
1. Power off the computer.
2. Remove the battery pack and measure the voltage between battery terminals 1 (+) and 7 (–). See the following figure:



Terminal	Voltage (V dc)
1	+ 0 to + 12.6
7	Ground (–)

3. If the voltage is less than +11.0 V dc, the battery pack has been discharged.

   Note: Recharging will take at least 3 hours, even if the indicator does not turn on.

   If the voltage is still less than +11.0 V dc after recharging, replace the battery.
4. If the voltage is more than +11.0 V dc, measure the resistance between battery terminals 4 and 7. The resistance must be 4 to 30 K Ω.

   If the resistance is not correct, replace the battery pack. If the resistance is correct, replace the system board.

Lenovo 3000 N200

Product overview

This section presents the following product-unique information:

- "Specifications"
- "Status indicators" on page 32
- "FRU tests" on page 33
- "Fn key combinations" on page 34

Specifications

The following table lists the specifications of the Lenovo 3000 N200:

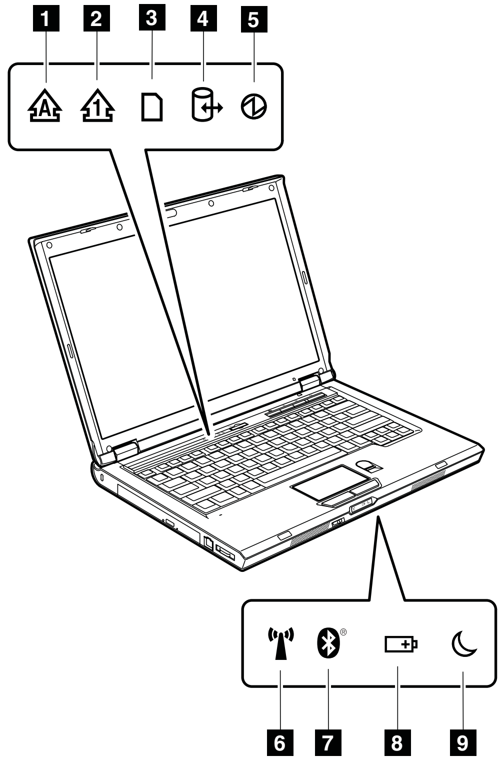
Feature	Description
Processor	• Intel Celeron M processor 540 (1.86 GHz), 1-MB L2 cache (533 MHz) • Intel Core 2 Duo processor T7100 (1.8GHz), 2-MB L2 cache (800 MHz) • Intel Core 2 Duo processor T7300 (2.0 GHz), 4-MB L2 cache (800 MHz) • Intel Core 2 Duo processor T7500 (2.2 GHz), 4-MB L2 cache (800 MHz) • Intel Celeron processor 530 (1.73GHz 533MHz 1MB L2) • Intel Celeron processor 550 (2.0GHz 533MHz 1MB L2) • Intel Core 2 Duo processor T5550 (1.83GHz 667MHz 2MBL2) • Intel Core 2 Duo processor T2330 (1.6GHz 533MHz 1MB L2) • Intel Core 2 Duo processor T2310 (1.46GHz 533MHz 1MBL2)
Bus architecture	• 667-MHz PSB • 667-MHz DDR2 SDRAM (PC2-5300) • HUB link • PCI bus • LPC bus • PCI Express bus
Graphic memory chip	• Intel 965GM • NVIDIA G72M-V (GO 7300)
Display	• 14.1-inch wide, 16M colors, WXGA (1280 × 768 resolution) TFT color LCD
Standard memory	• 512-MB DDR2-667 SDRAM SO-DIMM (PC2-5300) card × 1 • 512-MB DDR2-667 SDRAM SO-DIMM (PC2-5300) card × 2 • 1-GB DDR2-667 SDRAM SO-DIMM (PC2-5300) card × 1 • 2-GB DDR2-667 SDRAM SO-DIMM (PC2-5300) card × 1
Optional memory	• 512-MB DDR2-667 SDRAM SO-DIMM (PC2-5300) card × 1 • 1-GB DDR2-667 SDRAM SO-DIMM (PC2-5300) card × 1 • 2-GB DDR2-667 SDRAM SO-DIMM (PC2-5300) card × 1 (maximum of 2.0 GB)
CMOS RAM	• 242 bytes
Hard disk drive	• 60 GB, 5400 rpm, 9.5 mm high, SATA interface • 80 GB, 5400 rpm, 9.5 mm high, SATA interface • 120 GB, 5400 rpm, 9.5 mm high, SATA interface • 160 GB, 5400 rpm, 9.5 mm high, SATA interface Supported hard disk drives are depend on the model.
Optical drive	• DVD/CD-RW combo drive, 12.7 mm high • DVD-RAM/RW drive, 12.7 mm high

(continued)

Feature	Description
I/O port	• 5-1 Digital Media Reader • External monitor connector • Stereo headphone jack • Monaural microphone jack • RJ11 connector • RJ45 connector • TV-out connector (S-Video) • Universal serial bus (USB) connector × 4 (compatible with USB 1.1 and 2.0) • IEEE 1394 connector
Internal modem	• 56.6 Kbps
Audio	• Built-in stereo speakers • Software control volume
Ethernet (on the system board)	• 10/100 Ethernet
Mini PCI adapter	• Intel PRO Wireless 3945ABG Mini-PCI Express Adapter • Broadcom 802.11bg WLAN PCI-E Mini Card • Lenovo 11a/b/g/n Wireless LAN Mini-PCI Express Adapter • Intel Wireless WiFi Link 4965AGN
ExpressCard slot	• ExpressCard slot
Bluetooth wireless (some models)	• *Bluetooth* daughter card
Modem	• AMoM, 56 kbps V.92
Touch pad	Yes
Battery	• Li-ion battery (6 cells) 2.4 Ah
AC adapter	• 65-watt (20 V) slim type • 90-watt (20 V) type
Preinstalled operating system	• Windows Vista™ Home Premium (32 bit) • Windows Vista Home Basic (32 bit) • Windows Vista Business (32 bit) • Windows Vista Ultimate (32 bit)

Status indicators

The system status indicators show the status of the computer, as follows:



Indicator		Meaning
1	Caps lock	Caps Lock mode is enabled. You can enter all alphabetic characters (A-Z) in uppercase without pressing the Shift key. To enable or disable Caps Lock mode, press the CapsLk key.
2	Num lock	The numeric keypad on the keyboard is enabled. To enable or disable the keypad, press and hold the Fn key, and press the NmLk key.
3	5-1 Digital Media Reader status	A card in the 5-1 Digital Media Reader is being used to read and write data. When this indicator is blinking, do not put the computer into sleep (standby) mode, remove the card from the slot, or turn off the computer.
4	Drive in use	**Green:** Data is being read from or written to the hard disk drive. When this indicator is on, do not put the computer into sleep (standby) mode or turn off the computer. **Note:** Do not move the system while the green drive-in-use light is on. Sudden physical shock could cause drive errors.
5	Power on	**Green:** The computer is on and ready to use. This indicator stays lit whenever the computer is on and is not in sleep (standby) mode.

(continued)

Indicator	Meaning
6 Wireless status	**Green:** The wireless feature (the IEEE 802.11 standard or the IEEE802.11n) is on, and the radio link is ready for use. **Blinking green:** Data is being transmitted.
7 *Bluetooth* status	**Green:** *Bluetooth* wireless is operational. This indicator is on when *Bluetooth* wireless is on and not in suspend mode.
8 Battery status	**Green:** The battery is charged between 80% to 100% of the capacity, and being discharged between 0% to 80% of the capacity. **Blinking green:** The battery is charged between 20% to 80% of the capacity, and being charged. **Orange:** The battery is charged between 5% and 20% of the capacity, and being discharged. **Blinking orange (slow):** The battery is charged between 5% to 20% of the capacity, and being charged. **Blinking orange (rapid):** The battery is charged between 0% to 5% of the capacity.
9 Sleep (standby) status	**Green:** The computer is in sleep (standby) mode. **Blinking green:** The computer is entering sleep (standby) mode or hibernation mode, or is resuming normal operation.

FRU tests

The following table shows the test for each FRU.

FRU	Applicable test
System board	1. **Diagnostics** --> **CPU/Coprocessor** 2. **Diagnostics** --> **Systemboard**
LCD unit	1. **Diagnostics** --> **Video Adapter** 2. **Interactive Tests** --> **Video**
Keyboard	1. **Diagnostics** --> **Systemboard** --> **Keyboard** 2. **Interactive Tests** --> **Keyboard**
Hard disk drive	**Diagnostics** --> **Fixed Disks**
Diskette drive	• **Diagnostics** --> **Diskette Drives**
Memory	1. If two DIMMs are installed, remove one of them and run **Diagnostics** --> **Memory Test—Quick**. 2. If the problem does not recur, return the DIMM to its place, remove the other one, and run the test again. 3. If the test does not detect the error, run **Diagnostics** --> **Memory Test—Full**.

Fn key combinations

The following table shows the function of each combination of Fn with a function key.

Key combination	Description
Fn+F1	Volume down.
Fn+F2	Volume up.
Fn+F3	Reserved.
Fn+F4	Put the computer in sleep (standby) mode. To return to normal operation, press the Fn key only, without pressing a function key.
Fn+F5	Enable or disable the built-in wireless networking features and the *Bluetooth* features. If you press Fn+F5, a list of wireless features is displayed. You can quickly change the power state of each feature in the list.
Fn+F6	Reserved.
Fn+F7	Open the window for Choose Presentation or Display scheme. If you press this combination of keys, a list of schemes is displayed in the window. You can quickly select a scheme in the list.
Fn+F8	Reserved.
Fn+F9	Reserved.
Fn+F10	Make the computer display less bright.
Fn+F11	Make the computer display brighter.
Fn+F12	Put the computer into hibernation mode. To return to normal operation, press the power button.
Fn+Esc	Mute the sound from the computer.
Fn+Insert	Scroll Lock (ScrLk).
Fn+Delete	Numeric Lock (NmLk)
Fn+PrtSc	Has the same function as the SysRq key.
Fn+Pause	Has the same function as the Break key.
Fn+PgUp	Has the same function as the Home key.
Fn+PgDn	Has the same function as the End key.
Fn+cursor keys	These key combinations work with Windows Media Player. Fn+down arrow key works for the Play or Pause button, Fn+up arrow key for the Stop button, Fn+right arrow key for the Next Track button, and Fn+left arrow key for the Previous Track button.

Symptom-to-FRU index

The symptom-to-FRU index in this section lists symptoms and errors and their possible causes. The most likely cause is listed first, in boldface type.

Note: Do the FRU replacement or other actions in the sequence shown in the column headed "FRU or action, in sequence." If replacing a FRU does not solve the problem, put the original part back in the computer. Do not replace a nondefective FRU.

This index can also help you determine, during regular servicing, what FRUs are likely to need to be replaced next.

A numeric error is displayed for each error detected in POST or system operation. In the displays, **n** can be any number.

If no numeric code is displayed, check the narrative descriptions of symptoms. If the symptom is not described there, go to "Intermittent problems" on page 40.

Note

For a device not supported by diagnostic codes in the Lenovo 3000 notebook computers, see the manual for that device.

Numeric error codes

Symptom or error	FRU or action, in sequence
0200 Failure Fixed Disk	1. **Reseat the hard disk drive.** 2. Load Setup Defaults in BIOS Setup Utility. 3. Hard disk drive. 4. System board.
021x Keyboard error	1. **Keyboard**. 2. System board.
0220 Monitor type does not match CMOS—Run SETUP	**Load Setup Defaults in BIOS Setup Utility.**
0230 Shadow RAM Failed at offset:nnnn	**System board.**
0231 System RAM Failed at offset:nnnn	1. **DIMM.** 2. System board.
0232 Extended RAM Failed at offset:nnnn	1. **DIMM.** 2. System board.
0250 System battery is dead—Replace and run SETUP	1. **Charge the backup battery for more than 8 hours by connecting the ac adapter.** 2. Replace the backup battery and run BIOS Setup Utility to reset the time and date.
0251 System CMOS checksum bad—Default configuration use	1. **Charge the backup battery for more than 8 hours by connecting the ac adapter.** 2. Replace the backup battery and run BIOS Setup Utility to reset the time and date.

Symptom or error	FRU or action, in sequence
0260 System timer error	1. **Charge the backup battery for more than 8 hours by connecting the ac adapter.** 2. Replace the backup battery and run BIOS Setup Utility to reset the time and date. 3. System board.
0270 Real time clock error	1. **Charge the backup battery for more than 8 hours by connecting the ac adapter.** 2. Replace the backup battery and run BIOS Setup Utility to reset the time and date. 3. System board.
0280 Previous boot incomplete— Default configuration used	1. **Load "Setup Default" in BIOS Setup Utility.** 2. DIMM. 3. System board.
02F4 EISA CMOS not writable	1. **Load Setup Defaults in BIOS Setup Utility.** 2. Replace the backup battery. 3. System board.
02F5 DMA test failed	1. **DIMM.** 2. System board.
02F6 Software NMI failed	1. **DIMM.** 2. System board.
02F7 Fail-safe timer NMI failed	1. **DIMM.** 2. System board.

Error messages

Symptom or error	FRU or action, in sequence
Unsupported memory.	**DIMM**. Make sure to use supported memory.
Device address conflict.	1. **Load "Setup Defaults" in the BIOS Setup Utility**. 2. Backup battery. 3. System board.
Allocation error for device.	1. **Load "Setup Defaults" in the BIOS Setup Utility**. 2. Backup battery. 3. System board.
Failing bits: nnnn.	1. **DIMM**. 2. System board.
Invalid system configuration data.	1. **DIMM**. 2. System board.
I/O device IRQ conflict.	1. **Load "Setup Defaults" in the BIOS Setup Utility**. 2. Backup battery. 3. System board.
Hibernation error.	1. **Restore the system configuration to what it was before the computer entered hibernation mode**. 2. If memory size has been changed, re-create the hibernation file.
Fan error.	1. **Fan**. 2. Thermal grease. 3. System board.
Thermal sensing error.	**System board**.
Authentication of system services failed. Press <Esc> to resume.	**The Predesktop Area in the HDD is corrupted. Restore it from a recovery disc.**
Cannot boot from any device.	**Check the status of device which you want to boot from.** Device not found. 1. The device you want to boot from. 2. System board. Device Error. 1. The device you want to boot from. 2. System board. No valid operating system. 1. Check that the operating system has no failure and is installed correctly. 2. Reinstall the operation system. Excluded from boot order. • Enter the BIOS Setup Utility and add the device in boot order.

No-beep symptoms

Symptom or error	FRU or action, in sequence
No beep, power-on indicator on, LCD blank, and no POST.	1. **Make sure that every connector is connected tightly and correctly**. 2. DIMM. 3. System board.
No beep, power-on indicator on, and LCD blank during POST.	1. **Reseat DIMM**. 2. System board.
The power-on password prompt appears.	A power-on password or a supervisor password is set. Type the password and press **Enter**.
The hard-disk password prompt appears.	A hard-disk password is set. Type the password and press **Enter**.

LCD-related symptoms

Important

The TFT LCD for the notebook computer contains many thin-film transistors (TFTs). The presence of a small number of dots that are missing, discolored, or always lighted is characteristic of TFT LCD technology, but excessive pixel problems can cause viewing concerns. The LCD should be replaced if the number of missing, discolored, or lighted dots in any background is:

- **WXGA:** 8 or more bright dots, 8 or more dark dots, or a total of 9 or more bright and dark dots.

Note: A bright dot means a pixel is always on (white or color.) A dark dot means a pixel is always off (black color.)

Symptom or error	FRU or action, in sequence
No beep, power-on indicator on, and a blank LCD during POST.	**System board**.
• LCD backlight not working. • LCD too dark. • LCD brightness cannot be adjusted. • LCD contrast cannot be adjusted.	1. **Reseat the LCD connectors**. 2. LCD assembly. 3. System board.
• LCD screen unreadable. • Characters missing pixels. • Screen abnormal. • Wrong color displayed.	1. **See important note for "LCD-related symptoms."** 2. Reseat all LCD connectors. 3. LCD assembly. 4. System board.
Horizontal or vertical lines displayed on LCD.	**LCD assembly**.

Intermittent problems

Intermittent system hang problems can be due to a variety of causes that have nothing to do with a hardware defect, such as cosmic radiation, electrostatic discharge, or software errors. FRU replacement should be considered only when a problem recurs.

When analyzing an intermittent problem, do the following:
1. Run the diagnostic test for the system board in loop mode **at least 10 times**.
2. If no error is detected, do **not** replace any FRUs.
3. If any error is detected, replace the FRU shown by the FRU code. Rerun the test to verify that no more errors exist.

Undetermined problems

If the diagnostic tests did not identify the adapter or device that has failed, if wrong devices are installed, or if the system simply is not operating, follow these procedures to isolate the failing FRU (do not isolate FRUs that have no defects).

Verify that all attached devices are supported by the computer.

Verify that the power supply being used at the time of the failure is operating correctly. (See “Power system checkout” on page 26.)
1. Turn off the computer.
2. Visually check each FRU for damage. Replace any damaged FRU.
3. Remove or disconnect all of the following devices:
   a. Non-Lenovo 3000 devices
   b. Devices attached to the port replicator
   c. Printer, mouse, and other external devices
   d. Battery pack
   e. Hard disk drive
   f. External diskette drive or optical drive
   g. DIMM
   h. Optical disk or diskette in the internal drive
   i. PC Cards
4. Turn on the computer.
5. Determine whether the problem has been solved.
6. If the problem does not recur, reconnect the removed devices one at a time until you find the failing FRU.
7. If the problem remains, replace the following FRUs one at a time (do not replace a nondefective FRU):
   a. System board
   b. LCD assembly

FRU replacement notices

This section contains notices related to removing and replacing parts. Read this section carefully before replacing any FRU.

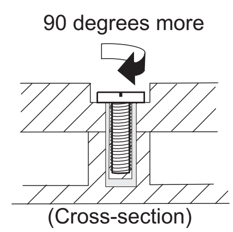
Screw notices

Loose screws can cause a reliability problem. In the Lenovo 3000 computer, this problem is addressed with special nylon-coated screws that have the following characteristics:
- They maintain tight connections.
- They do not easily come loose, even with shock or vibration.
- They are harder to tighten.
- Each one should be used only once.

Do the following when you service this machine:
- Keep the screw kit (for the P/N, see "Miscellaneous parts" on page 95) in your tool bag.
- Always use new screws.
- Use a torque screwdriver if you have one.

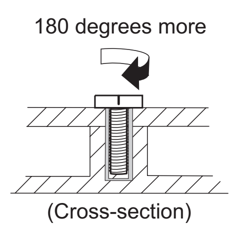
Tighten screws as follows:
- **Plastic to plastic**

  Turn an additional **90 degrees** after the screw head touches the surface of the plastic part:



- **Logic card to plastic**

  Turn an additional **180 degrees** after the screw head touches the surface of the logic card:



- **Torque driver**

  If you have a torque driver, refer to the "Torque" column for each step.
- Make sure that you use the correct screw. If you have a torque screwdriver, tighten all screws firmly to the torque shown in the table. **Never use a screw that you removed. Use a new one. Make sure that all of the screws are tightened firmly.**
- Ensure torque screwdrivers are calibrated correctly following country specifications.

Retaining serial numbers

This section includes the following descriptions:
- "Restoring the serial number of the system unit" on page 42

- "Retaining the UUID"
- "Reading or writing the ECA information"

Restoring the serial number of the system unit

When the computer was manufactured, the EEPROM on the system board was loaded with the serial numbers of the system and all major components. These numbers need to remain the same throughout the life of the computer.

If you replace the system board, you must restore the serial number of the system unit to its original value.

Before replacing the system board, save the original serial number by doing the following:

1. Install the CE Utility Diskette for Lenovo 3000 notebooks, and restart the computer.
2. From the main menu, select **1. Set System Identification**.
3. Select **2. Read S/N data from EEPROM**.

The serial number of each device in your computer is displayed; the serial number of the system unit is listed as follows:

- 20: Serial number

Write down that number.

Note: The serial number of the system unit is also written on the label attached to the bottom of the computer.

After you have replaced the system board, restore the serial number by doing the following:

1. Install the CE Utility Diskette for Lenovo 3000 notebooks and restart the computer.
2. From the main menu, select **1. Set System Identification**.
3. Select **1. Add S/N data from EEPROM**.

   Follow the instructions on the screen.

Retaining the UUID

The Universally Unique Identifier (UUID) is a 128-bit number uniquely assigned to your computer at production and stored in the EEPROM of your system board. The algorithm that generates the number is designed to provide unique IDs until the year A.D. 3400. No two computers in the world have the same number.

When you replace the system board, you must set the UUID on the new system board as follows:

1. Install the CE Utility Diskette for Lenovo 3000 notebooks, and restart the computer.
2. From the main menu, select **4. Assign UUID**.

   A new UUID is created and written. If a valid UUID already exists, it is not overwritten.

Reading or writing the ECA information

Information on Engineering Change Announcements (ECA) are stored in the EEPROM of the system board. The electronic storage of this information simplifies the procedure to check if the ECA has been previously applied to a machine. The machine does not need to be disassembled to check for the ECA application.

To check what ECAs have been previously applied to the machine, use the ECA Information Read/Write function on the CE Utility Diskette for Lenovo 3000 notebooks.

1. Insert the CE Utility Diskette for Lenovo 3000 notebooks, and restart the computer.
2. From the main menu, select **6. Set ECA Information**.
3. To read ECA information, select **2. Read ECA/rework number from EEPROM** and follow the instruction.
4. To read box build date, select **5. Read box build date from EEPROM**, and follow the instruction on the screen.

After an ECA has been applied to the machine, the EEPROM must be updated to reflect the ECA's application. Use the CE Utility Diskette for Lenovo 3000 notebooks to update the EEPROM.

Note: Only the ECA number is stored in the EEPROM. The machine type of the ECA is assumed be the same as the machine type of the machine that had the ECA applied to it.

1. Insert the CE Utility Diskette for Lenovo 3000 notebooks, and restart the computer.
2. From the main menu, select **6. Set ECA Information**.
3. To write ECA information, select **1. Write ECA/rework number from EEPROM**, and follow the instruction.
4. To write box build date, select **4. Write box build date from EEPROM**, and follow the instruction on the screen.

If the system board is being replaced, try to read the ECA information from the old system board and transfer the information to the new system. If the system board is inoperable, this will not be possible.

Removing and replacing a FRU

This section presents directions and drawings for use in removing and replacing a FRU. Be sure to observe the following general rules:

1. Do not try to service any computer unless you have been trained and certified. An untrained person runs the risk of damaging parts.
2. Before replacing any FRU, review "FRU replacement notices" on page 41.
3. Begin by removing any FRUs that have to be removed before the failing FRU. Any such FRUs are listed at the top of the page. Remove them in the order in which they are listed.
4. Follow the correct sequence in the steps for removing the FRU, as given in the drawings by the numbers in square callouts.
5. When turning a screw to replace a FRU, turn it in the direction as given by the arrow in the drawing.
6. When removing the FRU, move it in the direction as given by the arrow in the drawing.
7. To put the new FRU in place, reverse the removal procedure and follow any notes that pertain to replacement. For information about connecting and arranging internal cables, see "Locations" on page 79.
8. When replacing a FRU, use the correct screw as shown in the procedures.

⚠ **DANGER**

Before removing any FRU, turn off the computer, unplug all power cords from electrical outlets, remove the battery pack, and then disconnect any interconnecting cables.

Attention: After replacing a FRU, do not turn on the computer until you have made sure that all screws, springs, and other small parts are in place and none are loose inside the computer. Verify this by shaking the computer gently and listening for rattling sounds. Metallic parts or metal flakes can cause electrical short circuits.

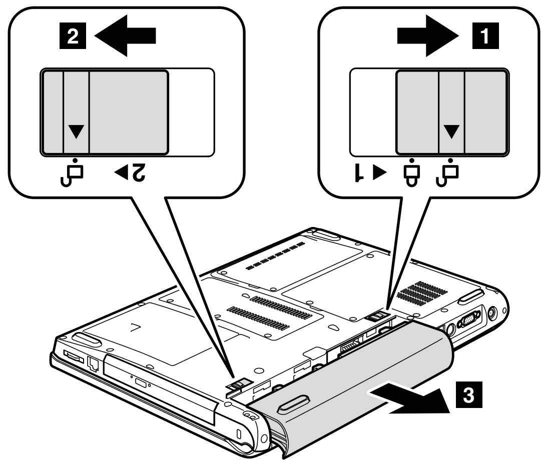
Attention: The system board is sensitive to, and can be damaged by, electrostatic discharge. Before touching it, establish personal grounding by touching a ground point with one hand or by using an electrostatic discharge (ESD) strap (P/N 6405959).

1010 Battery pack

⚠ **DANGER**

Use only the battery specified in the parts list for your computer. Any other battery could ignite or explode.

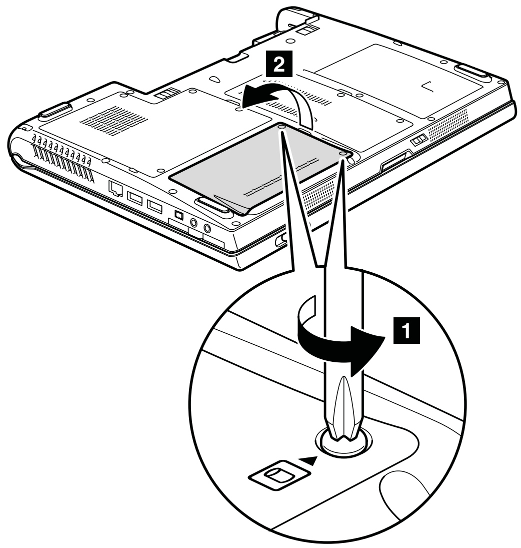
Unlock the battery release lever **1** and holding the battery release lever in the unlocked position **2**, remove the battery pack in the direction shown by arrow **3**.



1020 Hard disk drive slot cover

For access, remove this FRU:
- "1010 Battery pack" on page 45

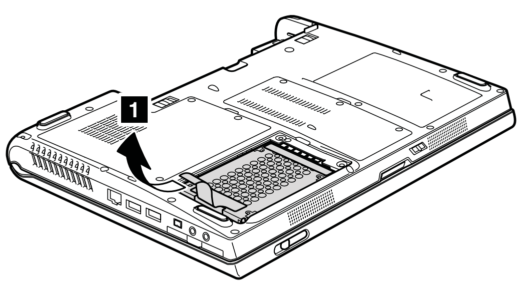
Note: Loosen the screws **1**, but do not remove them.



1030 Hard disk drive

For access, remove these FRUs in order:
- "1010 Battery pack" on page 45
- "1020 Hard disk drive slot cover"

Attention
- **Do not drop the hard disk drive or apply any physical shock to it.** The hard disk drive is sensitive to physical shock. Improper handling can cause damage and permanent loss of data.
- Before removing the drive, have the user make a backup copy of all the information on it if possible.
- Never remove the drive while the system is operating or is in suspend mode.

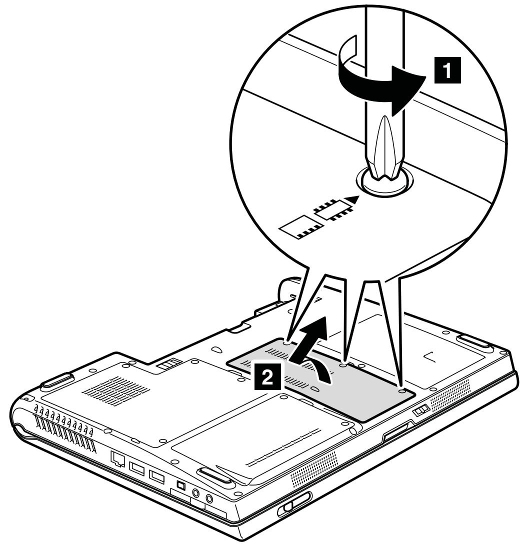


When installing: Make sure that the hard disk drive connector is attached firmly.

1040 DIMM slot cover

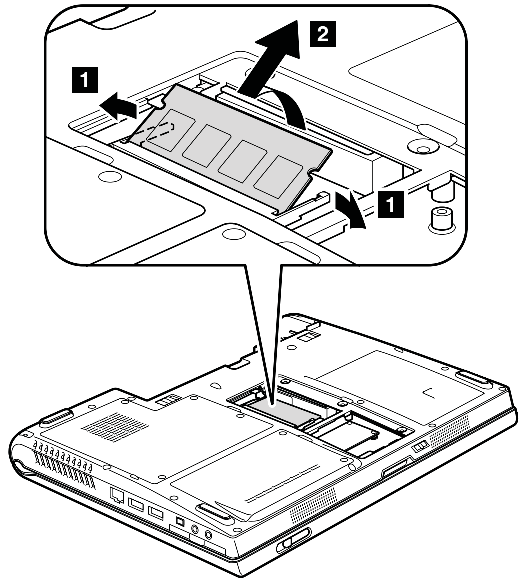
For access, remove this FRU:
- "1010 Battery pack" on page 45

Note: Loosen the screws **1**, but do not remove them.



1050 DIMM

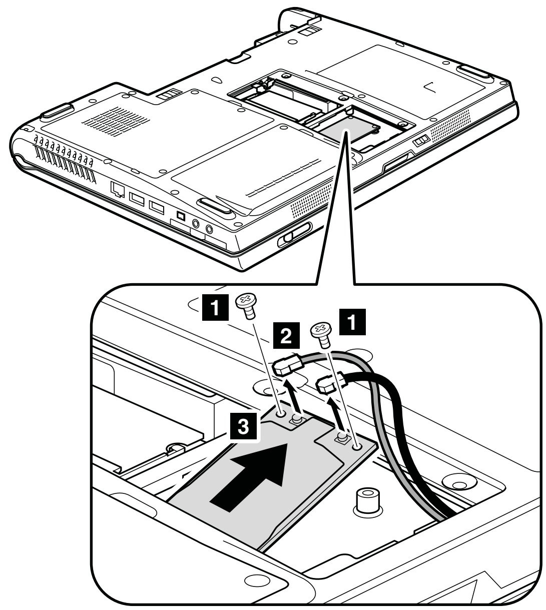
For access, remove these FRUs in order:
- "1010 Battery pack" on page 45
- "1040 DIMM slot cover" on page 47



When installing: Insert the notched end of the DIMM into the socket. Press the DIMM firmly, and pivot it until it snaps into the place. Make sure that it is firmly fixed in the slot and does not move easily.

1060 PCI Express Mini Card for 802.11 a/b/g wireless LAN

For access, remove these FRUs in order:
- "1010 Battery pack" on page 45
- "1040 DIMM slot cover" on page 47



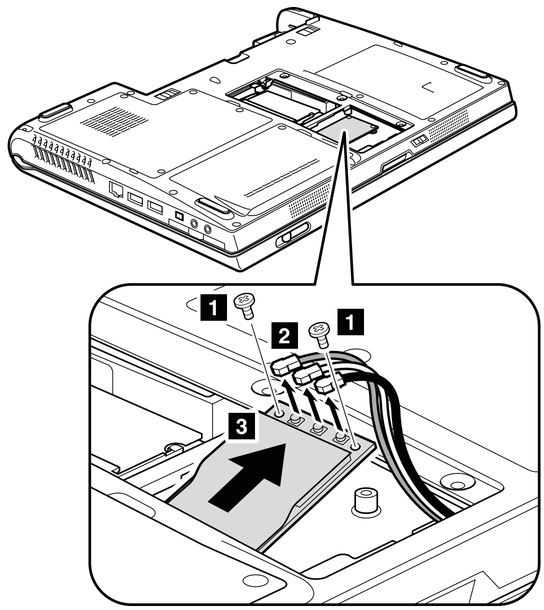
Step	Screw (quantity)	Color	Torque
1	M2 × 3 mm, pan-head, nylon-coated (2)	Black	0.245 Nm (2.5 kgfcm)

In step 2 , unplug the jacks by using the removal tool antenna RF connector (P/N: 08K7159) or pick the connectors with your fingers and gently unplug them in direction of the arrow.

When installing: Plug the gray cable into the jack labeled **MAIN** on the card, and the black cable into the jack labeled **AUX**.

1070 PCI Express Mini Card for 802.11 a/b/g/n wireless LAN

For access, remove these FRUs in order:
- “1010 Battery pack” on page 45
- “1040 DIMM slot cover” on page 47



Step	Screw (quantity)	Color	Torque
1	M2 × 3 mm, pan-head, nylon-coated (2)	Black	0.245 Nm (2.5 kgfcm)

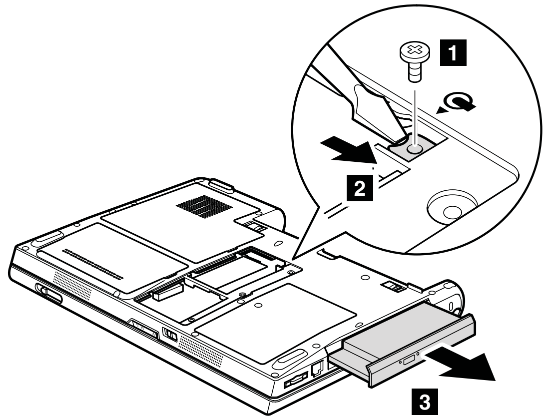
In step 2, unplug the jacks by using the removal tool antenna RF connector (P/N: 08K7159) or pick the connectors with your fingers and gently unplug them in direction of the arrow.

When installing: Plug the gray cable (MAIN) into the jack labeled **1** , the black cable (AUX) into the jack labeled **2**, and the white cable (MIMO) into the jack labeled **3** on the card.

1080 Optical drive

For access, remove these FRUs in order:

- "1010 Battery pack" on page 45
- "1040 DIMM slot cover" on page 47



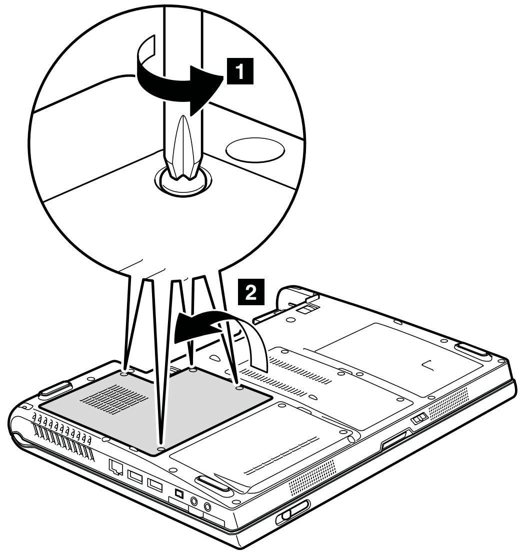
Step	Screw (quantity)	Color	Torque
1	M2.5 × 6 mm, pan-head, nylon-coated (1)	Dark silver	0.392 Nm (4 kgfcm)

1090 Heat sink assembly slot cover

For access, remove this FRU:

- "1010 Battery pack" on page 45

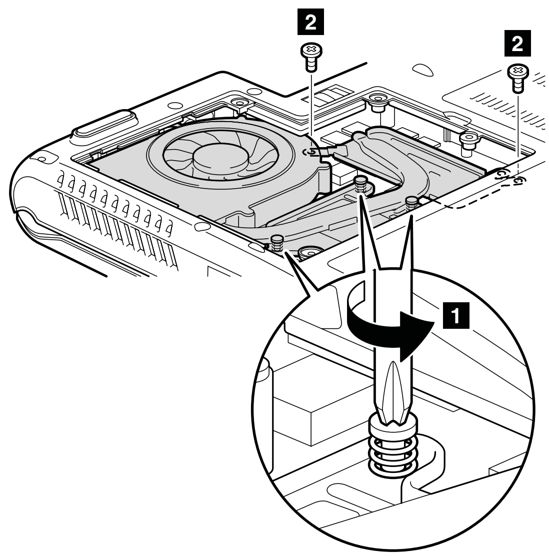
Note: Loosen the screws **1**, but do not remove them.



1100 Heat sink assembly

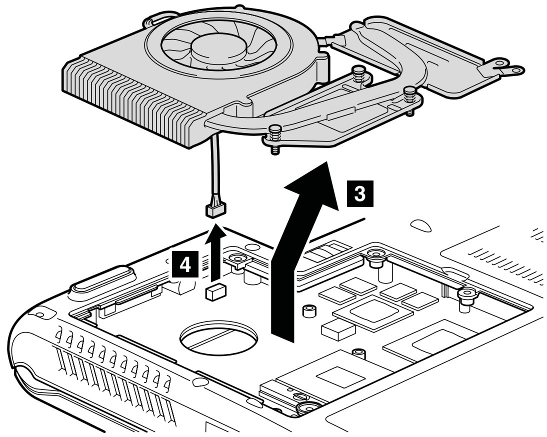
For access, remove this FRU:
- "1010 Battery pack" on page 45
- "1090 Heat sink assembly slot cover" on page 52

Note: Loosen the screws **1**, but do not remove them.

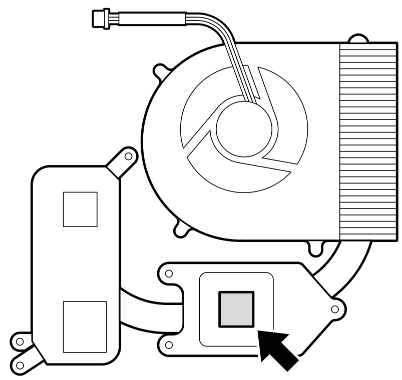


Step	Screw (quantity)	Color	Torque
2	M2 × 3 mm, pan-head, nylon-coated (2)	Black	0.245 Nm (2.5 kgfcm)

(continued)



When installing: Make sure that the fan connector is attached firmly.



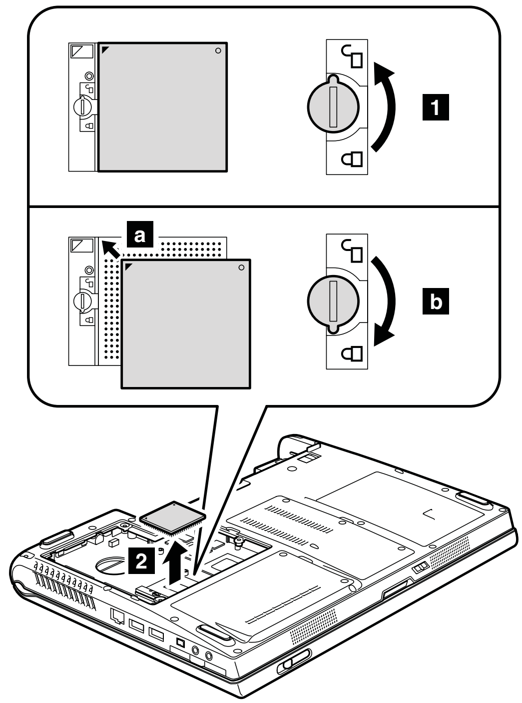
When installing: Before you attach a new heat sink assembly to the computer, peel off the covering film of thermal grease. Then attach the heat sink assembly to the computer.

1110 CPU

For access, remove these FRUs in order:
- "1010 Battery pack" on page 45
- "1090 Heat sink assembly slot cover" on page 52
- "1100 Heat sink assembly" on page 53

Attention: CPU is extremely sensitive. When you service the CPU, avoid any kind of rough handling.

Rotate the head of the screw in the direction shown by arrow **1** to release the lock; then remove the CPU in the direction shown by arrow **2**.

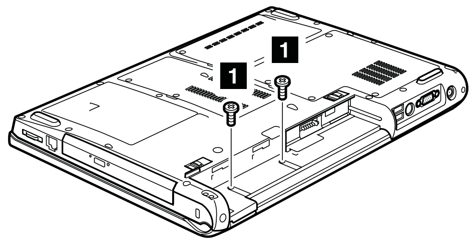


When installing: Place the CPU on the CPU socket **a**, and then rotate the head of the screw in the direction shown by arrow **b** to secure the CPU.

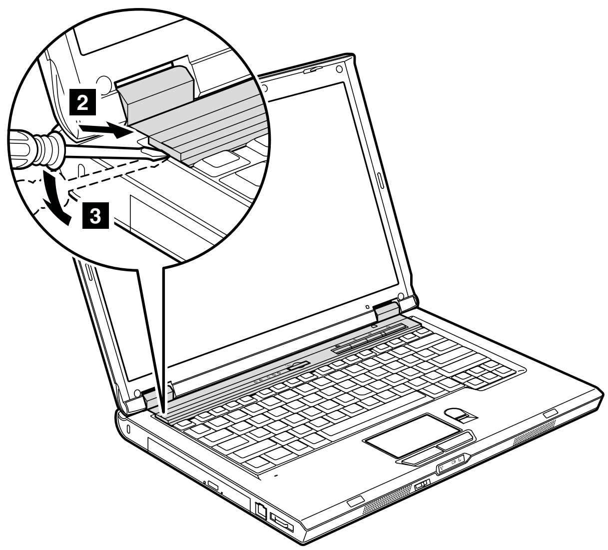
1120 Middle cover and function board

For access, remove this FRU:
- "1010 Battery pack" on page 45

Note: The function board is attached to the middle cover.

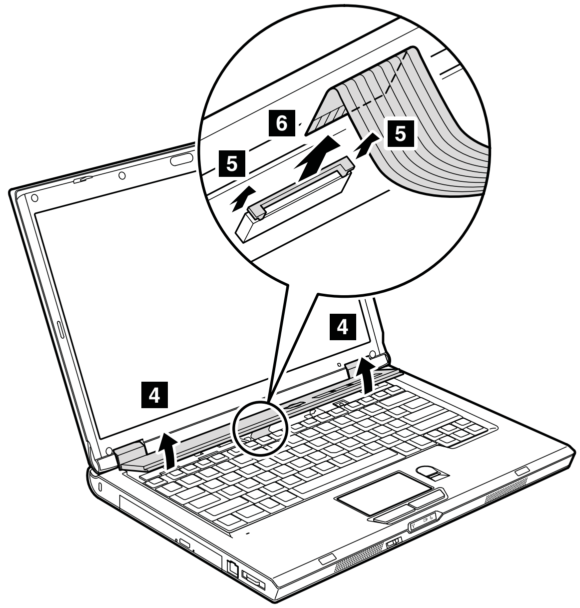


Step	Screw (quantity)	Color	Torque
1	M2.5 × 3 mm, wafer-head, nylon-coated (2)	Silver	0.392 Nm (4 kgfcm)



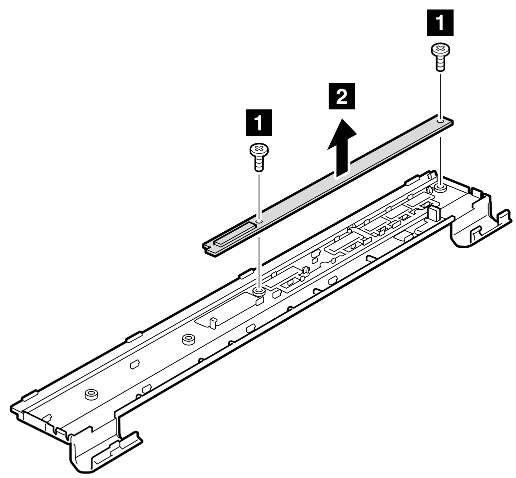
(continued)

Lift the cover a little in the direction shown by arrow **4**. Then unlock the connector **5** and detach the connector **6**.



When installing: Make sure that the connector is attached firmly.

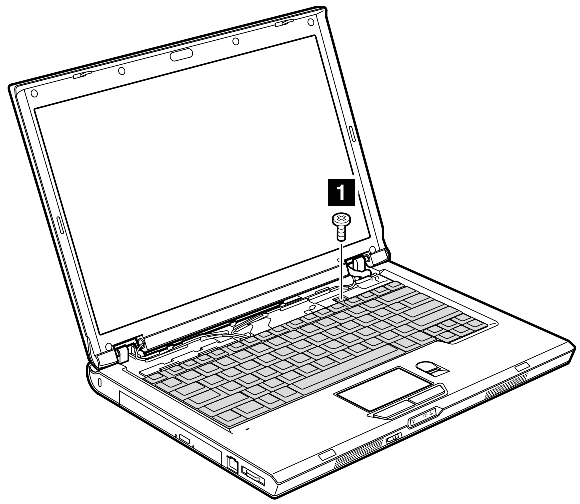
To remove the function board, do as follows:



Step	Screw (quantity)	Color	Torque
2	M2 × 3 mm, pan-head, nylon-coated (2)	Black	0.392 Nm (4 kgfcm)

1130 Keyboard

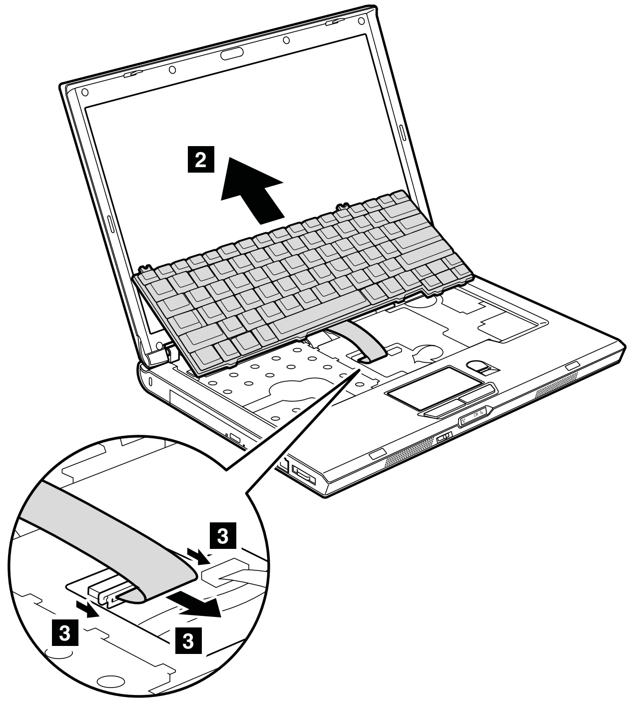
For access, remove these FRUs in order:
- “1010 Battery pack” on page 45
- “1120 Middle cover and function board” on page 56



Step	Screw (quantity)	Color	Torque
1	M2 x 3 mm, pan-head, nylon-coated (1)	Black	0.245 Nm (2.5 kgfcm)

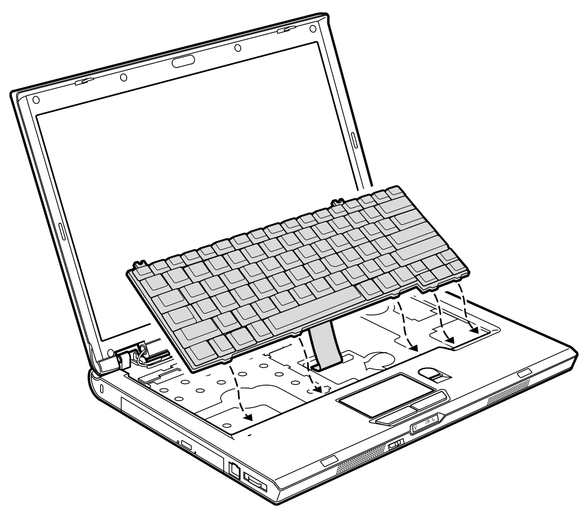
(continued)

Lift the keyboard a little in the direction shown by arrow **2**. Then unlock the connector **3** and detach the connector.



When installing:

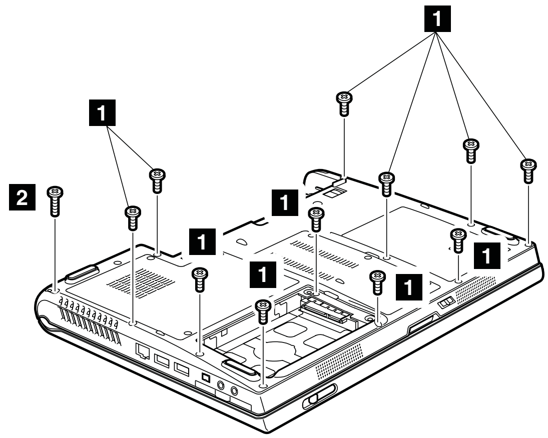
1. Make sure that the keyboard connector is attached firmly. Then lock the connector.
2. Make sure that the front side of the keyboard is under the frame.



1140 Keyboard bezel and fingerprint reader card

For access, remove these FRUs in order:
- "1010 Battery pack" on page 45
- "1020 Hard disk drive slot cover" on page 46
- "1040 DIMM slot cover" on page 47
- "1060 PCI Express Mini Card for 802.11 a/b/g wireless LAN" on page 49
- "1070 PCI Express Mini Card for 802.11 a/b/g/n wireless LAN" on page 50
- "1120 Middle cover and function board" on page 56
- "1130 Keyboard" on page 58

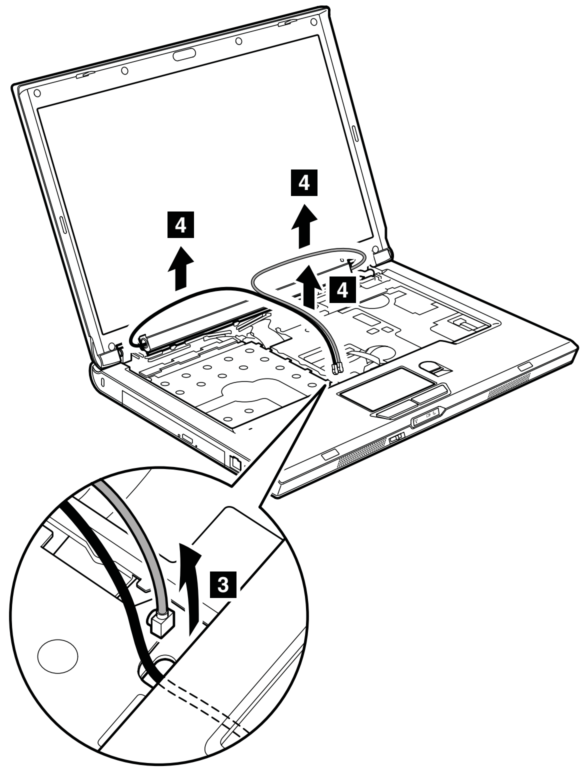
Note: The fingerprint reader card is attached underside of the keyboard bezel.



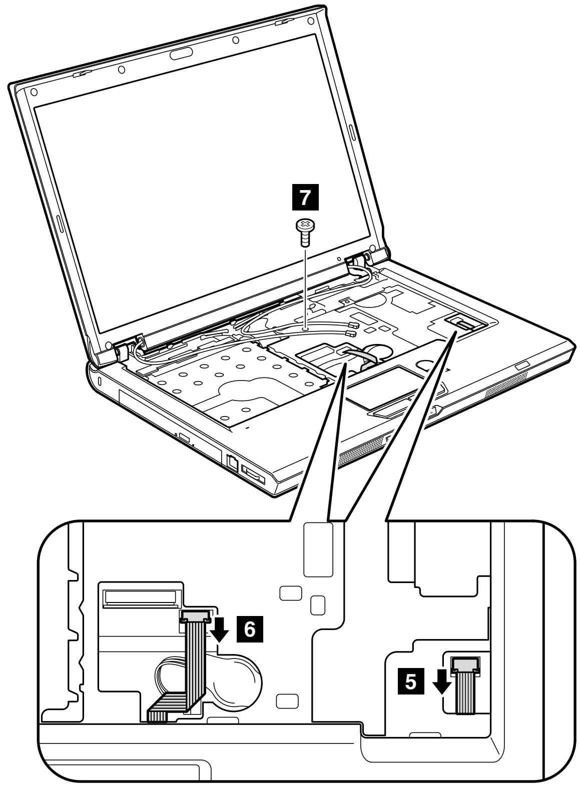
Step	Screw (quantity)	Color	Torque
1	M2.5 × 6 mm, pan-head, nylon-coated (11)	Dark silver	0.392 Nm (4 kgfcm)
2	M2.5 × 13 mm, pan-head, nylon-coated (1)	Dark silver	0.392 Nm (4 kgfcm)

(continued)

Pull out the wireless LAN antenna cables from the guide hole of the system board **3**, and release them from the cable guides of the frame **4**.

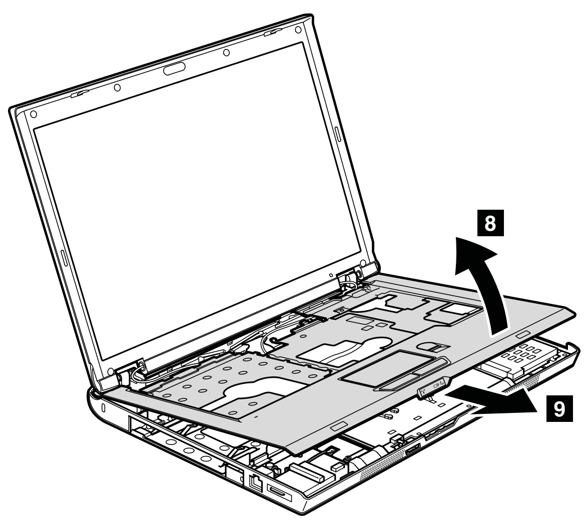


When installing: Route the antenna cables along the cable guides. When you route the cables, do not tense them. To do so, the cables may get damaged by the cable guides of the frame, and may cause a broken wire.



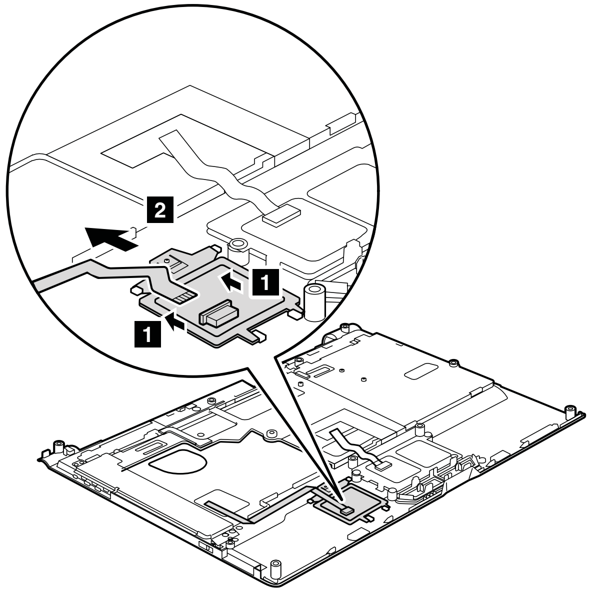
Step	Screw (quantity)	Color	Torque
7	M2.5 × 6 mm, pan-head, nylon-coated (1)	Dark silver	0.392 Nm (4 kgfcm)

When installing: Make sure that the connectors are attached firmly.

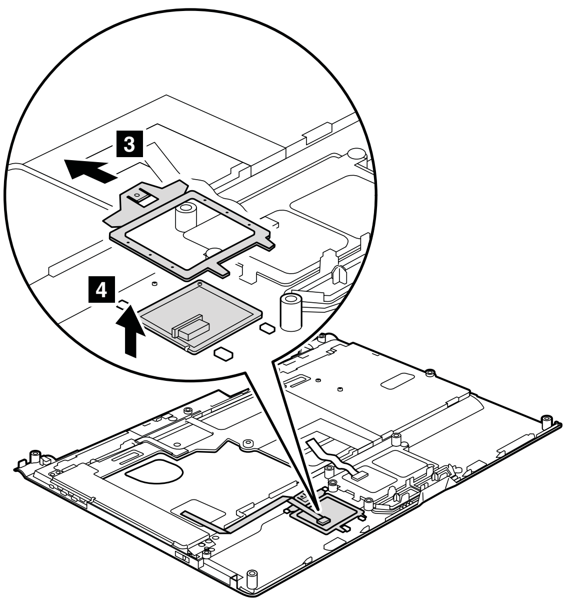


(continued)

To remove the fingerprint reader card, do as follows:



Slide the metal bracket of the fingerprint reader card in the direction shown by the arrow **3**, and then remove the fingerprint reader card **4**.



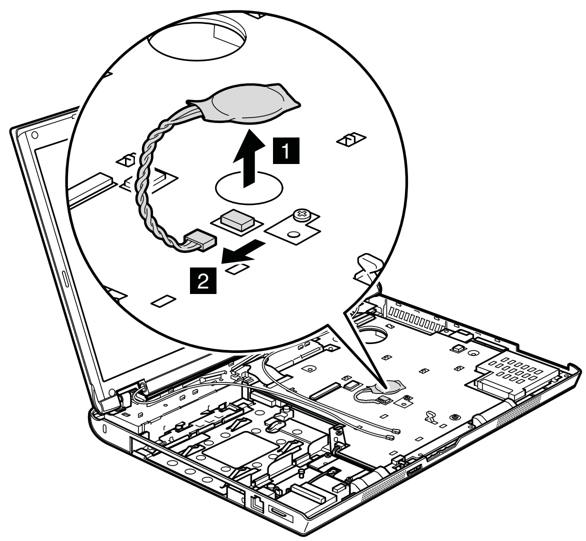
When installing: Make sure that the connector is attached firmly.

1150 Backup battery

⚠ **DANGER**

Use only the battery specified in the parts list for your computer. Any other battery could ignite or explode.

For access, remove these FRUs in order:
- "1010 Battery pack" on page 45
- "1020 Hard disk drive slot cover" on page 46
- "1060 PCI Express Mini Card for 802.11 a/b/g wireless LAN" on page 49
- "1070 PCI Express Mini Card for 802.11 a/b/g/n wireless LAN" on page 50
- "1120 Middle cover and function board" on page 56
- "1130 Keyboard" on page 58
- "1140 Keyboard bezel and fingerprint reader card" on page 60

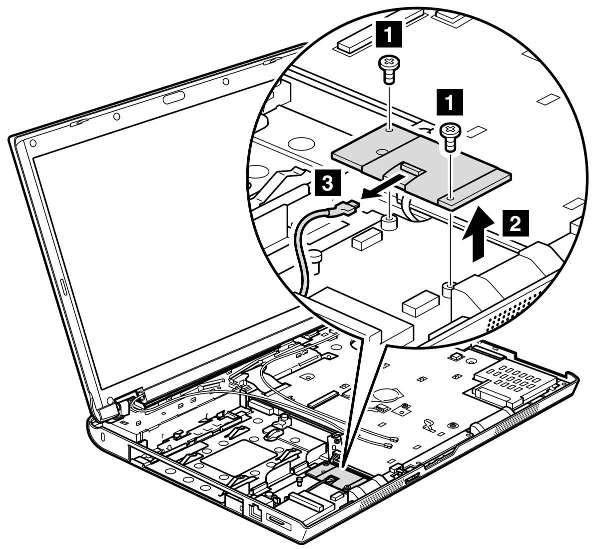


When installing: Make sure that the battery connector is attached firmly.

1160 Modem daughter card (MDC)

For access, remove these FRUs in order:

- “1010 Battery pack” on page 45
- “1020 Hard disk drive slot cover” on page 46
- “1060 PCI Express Mini Card for 802.11 a/b/g wireless LAN” on page 49
- “1070 PCI Express Mini Card for 802.11 a/b/g/n wireless LAN” on page 50
- “1120 Middle cover and function board” on page 56
- “1130 Keyboard” on page 58
- “1140 Keyboard bezel and fingerprint reader card” on page 60



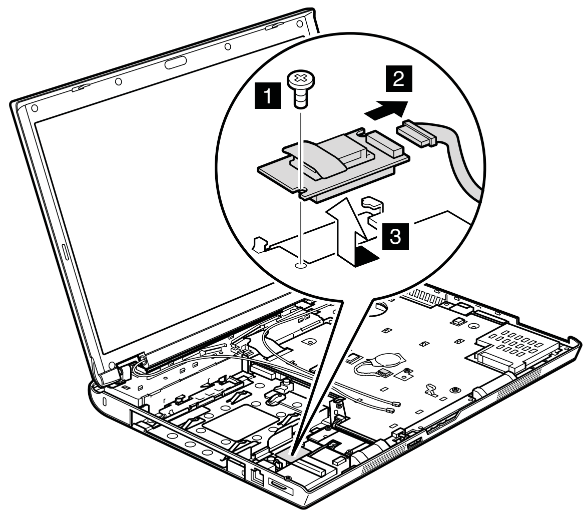
Step	Screw (quantity)	Color	Torque
1	M2 × 3 mm, pan-head, nylon-coated (2)	Black	0.245 Nm (2.5 kgfcm)

When installing: Make sure that the connector is attached firmly.

1170 *Bluetooth* daughter card (BDC)

For access, remove these FRUs in order:

- “1010 Battery pack” on page 45
- “1020 Hard disk drive slot cover” on page 46
- “1060 PCI Express Mini Card for 802.11 a/b/g wireless LAN” on page 49
- “1070 PCI Express Mini Card for 802.11 a/b/g/n wireless LAN” on page 50
- “1120 Middle cover and function board” on page 56
- “1130 Keyboard” on page 58
- “1140 Keyboard bezel and fingerprint reader card” on page 60

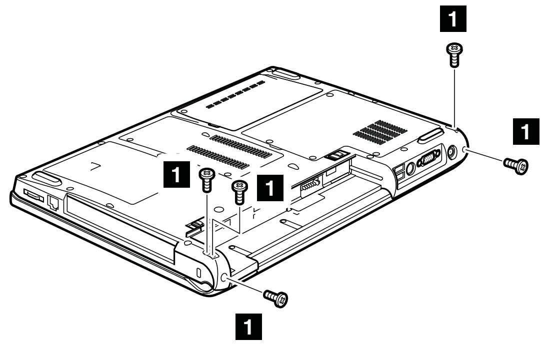


Step	Screw (quantity)	Color	Torque
1	M2 × 3 mm, pan-head, nylon-coated (1)	Black	0.245 Nm (2.5 kgfcm)

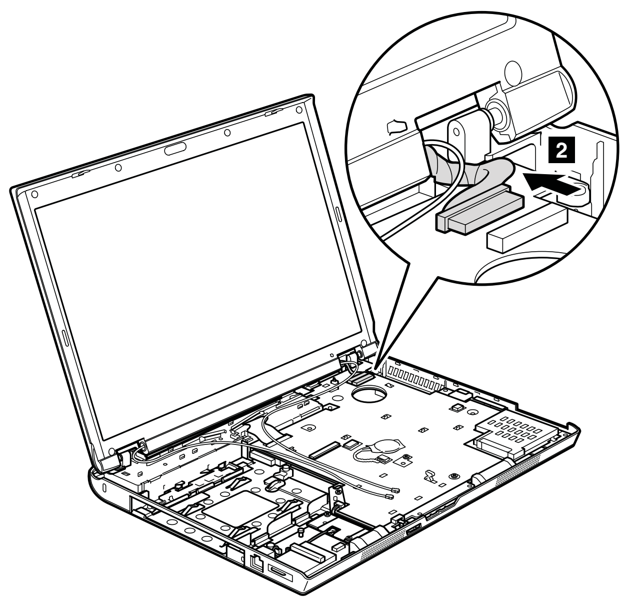
When installing: Make sure that the connector is attached firmly.

1180 LCD unit

For access, remove these FRUs in order:
- "1010 Battery pack" on page 45
- "1020 Hard disk drive slot cover" on page 46
- "1060 PCI Express Mini Card for 802.11 a/b/g wireless LAN" on page 49
- "1070 PCI Express Mini Card for 802.11 a/b/g/n wireless LAN" on page 50
- "1120 Middle cover and function board" on page 56
- "1130 Keyboard" on page 58
- "1140 Keyboard bezel and fingerprint reader card" on page 60

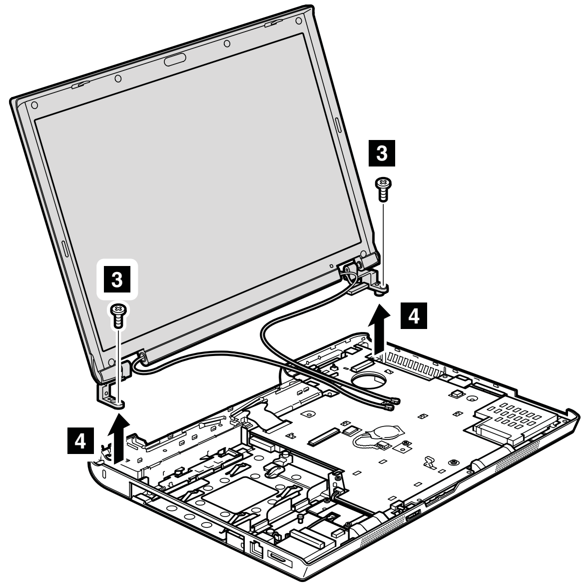


Step	Screw (quantity)	Color	Torque
1	M2.5 × 9 mm, pan-head, nylon-coated (5)	Dark silver	0.392 Nm (4 kgfcm)



When installing: Make sure that the connector is attached firmly.

(continued)



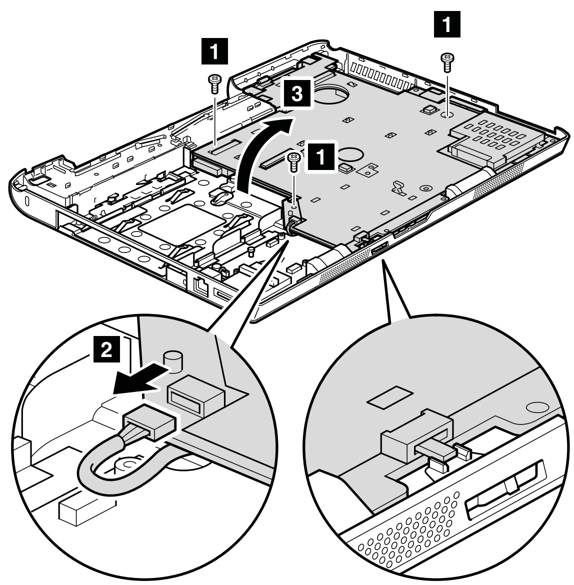
Step	Screw (quantity)	Color	Torque
3	M2.5 × 9 mm, pan-head, nylon-coated (2)	Dark silver	0.392 Nm (4 kgfcm)

1190 System board, 5-1 Digital Media Reader board, ExpressCard slot, and base cover

For access, remove these FRUs, in order:

- “1010 Battery pack” on page 45
- “1020 Hard disk drive slot cover” on page 46
- “1060 PCI Express Mini Card for 802.11 a/b/g wireless LAN” on page 49
- “1070 PCI Express Mini Card for 802.11 a/b/g/n wireless LAN” on page 50
- “1120 Middle cover and function board” on page 56
- “1130 Keyboard” on page 58
- “1140 Keyboard bezel and fingerprint reader card” on page 60
- “1150 Backup battery” on page 64
- “1160 Modem daughter card (MDC)” on page 65
- “1170 ***Bluetooth*** daughter card (BDC)” on page 66
- “1180 LCD unit” on page 67

Note: The 5-1 Digital Media Reader board and the ExpressCard slot are attached to the system board.

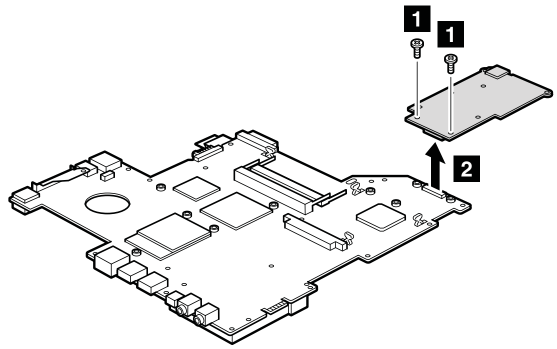


Step	Screw (quantity)	Color	Torque
1	M2.5 × 6 mm, pan-head, nylon-coated (3)	Dark silver	0.392 Nm (4 kgfcm)

When installing: Make sure that the connector is attached firmly.

(continued)

To remove the 5-1 Digital Media Reader board, do as follows:

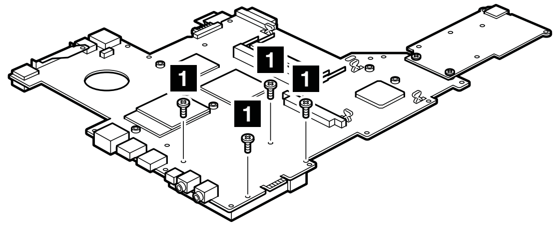


Step	Screw (quantity)	Color	Torque
1	M2 × 3 mm, pan-head, nylon-coated (2)	Black	0.245 Nm (2.5 kgfcm)

When installing: Make sure that the connector is attached firmly.

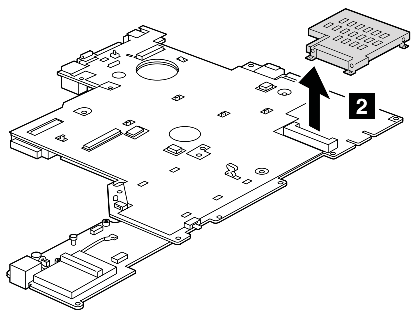
(continued)

To remove the ExpressCard slot, do as follows:



Step	Screw (quantity)	Color	Torque
1	M2 × 3 mm, pan-head, nylon-coated (4)	Black	0.245 Nm (2.5 kgfcm)

Turn over the system board, and disconnect the ExpressCard slot assembly.

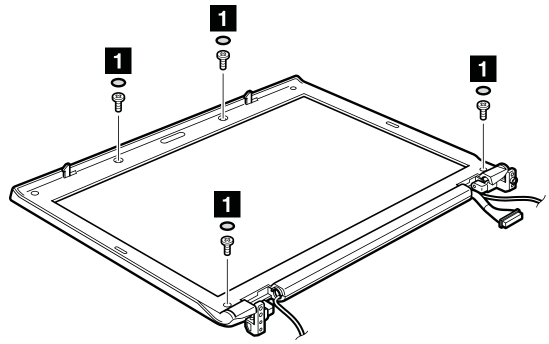


When installing: Make sure that the connector is attached firmly, and then fasten the screws.

2010 LCD front bezel

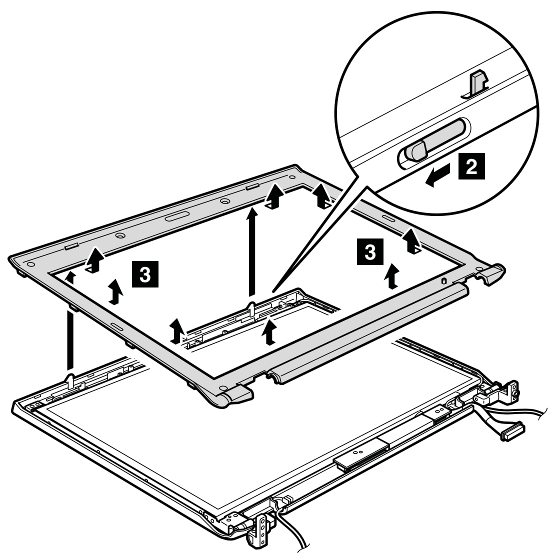
For access, remove this FRU:

- “1010 Battery pack” on page 45



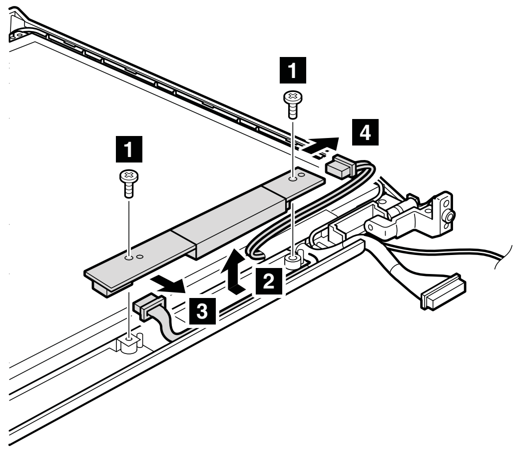
Step	Screw cap	Screw (quantity)	Color	Torque
1	○	M2.5 × 5 mm, pan-head, nylon-coated (4)	Silver	0.392 Nm (4 kgfcm)

In step 2, while sliding the LCD latch lever in the direction shown by the arrow, remove the bezel in the direction shown by arrow 3.



2020 Inverter card

For access, remove these FRUs in order:
- "1010 Battery pack" on page 45
- "2010 LCD front bezel" on page 72



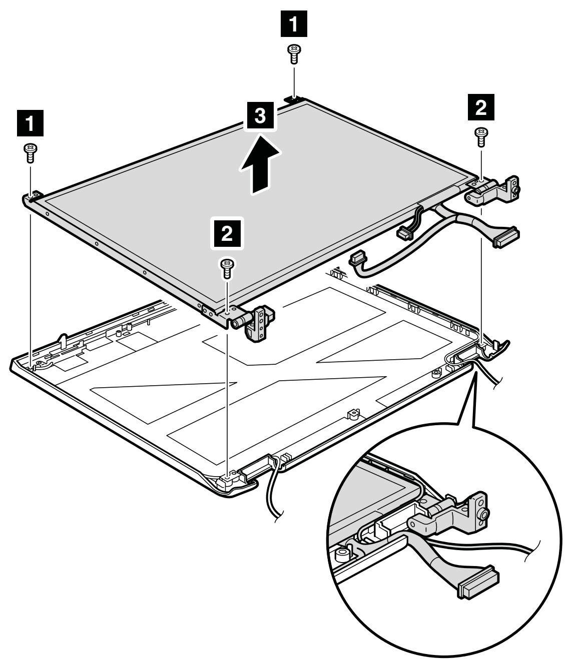
Step	Screw (quantity)	Color	Torque
1	M2.5 × 5 mm, pan-head, nylon-coated (2)	Silver	0.392 Nm (4 kgfcm)

When installing: Make sure that connectors 3 and 4 are attached firmly.

2030 LCD panel, LCD cable, and hinges

For access, remove these FRUs in order:

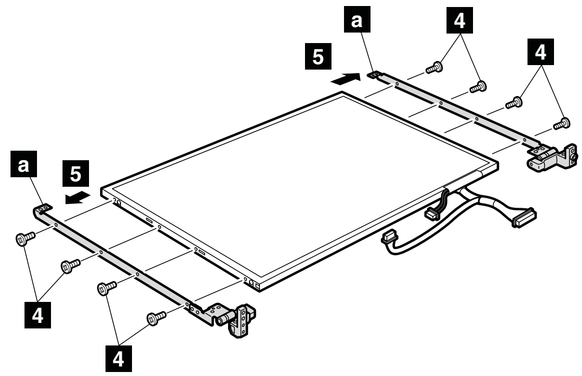
- "1010 Battery pack" on page 45
- "1020 Hard disk drive slot cover" on page 46
- "1060 PCI Express Mini Card for 802.11 a/b/g wireless LAN" on page 49
- "1070 PCI Express Mini Card for 802.11 a/b/g/n wireless LAN" on page 50
- "1120 Middle cover and function board" on page 56
- "1130 Keyboard" on page 58
- "1140 Keyboard bezel and fingerprint reader card" on page 60
- "1180 LCD unit" on page 67
- "2010 LCD front bezel" on page 72
- "2020 Inverter card" on page 73



Step	Screw (quantity)	Color	Torque
1	M2.5 × 4 mm, pan-head, nylon-coated (2)	Silver	0.392 Nm (4 kgfcm)
2	M2.5 × 5 mm, pan-head, nylon-coated (2)	Silver	0.392 Nm (4 kgfcm)

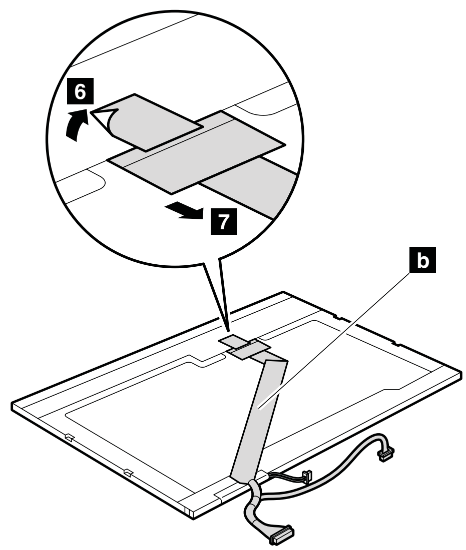
(continued)

Remove the hinges (a) from the LCD panel.



Step	Screw (quantity)	Color	Torque
4	M2 × 2.5 mm, pan-head, nylon-coated (8)	Silver	0.245 Nm (2.5 kgfcm)

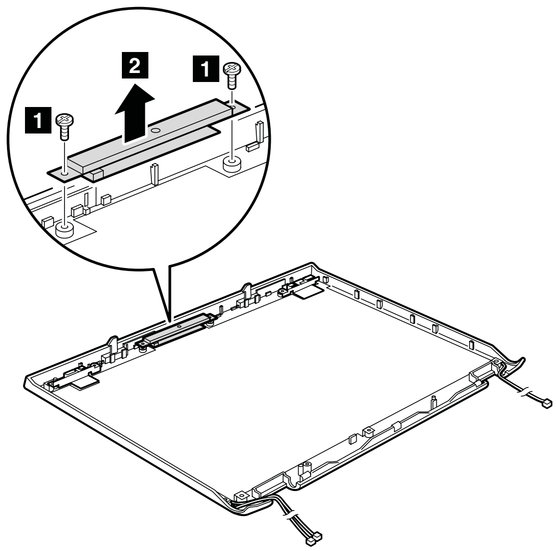
Remove the LCD cable assembly (b) from the LCD panel.



2040 Camera and LCD rear cover assembly

For access, remove these FRUs in order:

- “1010 Battery pack” on page 45
- “1020 Hard disk drive slot cover” on page 46
- “1060 PCI Express Mini Card for 802.11 a/b/g wireless LAN” on page 49
- “1070 PCI Express Mini Card for 802.11 a/b/g/n wireless LAN” on page 50
- “1120 Middle cover and function board” on page 56
- “1130 Keyboard” on page 58
- “1140 Keyboard bezel and fingerprint reader card” on page 60
- “1180 LCD unit” on page 67
- “2010 LCD front bezel” on page 72
- “2020 Inverter card” on page 73
- “2030 LCD panel, LCD cable, and hinges” on page 74



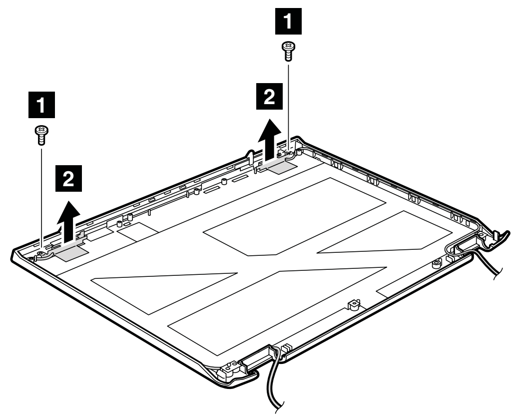
Step	Screw (quantity)	Color	Torque
1	M2.5 × 4 mm, pan-head, nylon-coated (2)	Silver	0.392 Nm (4 kgfcm)

2050 Wireless LAN antenna cables

For access, remove these FRUs in order:

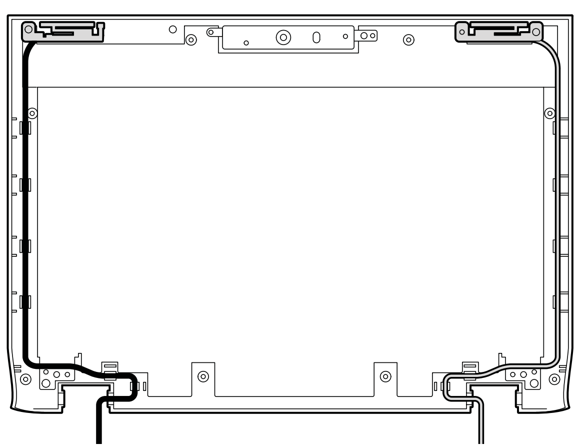
- "1010 Battery pack" on page 45
- "1020 Hard disk drive slot cover" on page 46
- "1060 PCI Express Mini Card for 802.11 a/b/g wireless LAN" on page 49
- "1070 PCI Express Mini Card for 802.11 a/b/g/n wireless LAN" on page 50
- "1120 Middle cover and function board" on page 56
- "1130 Keyboard" on page 58
- "1140 Keyboard bezel and fingerprint reader card" on page 60
- "1180 LCD unit" on page 67
- "2010 LCD front bezel" on page 72
- "2020 Inverter card" on page 73
- "2030 LCD panel, LCD cable, and hinges" on page 74

For the antennas with two cables



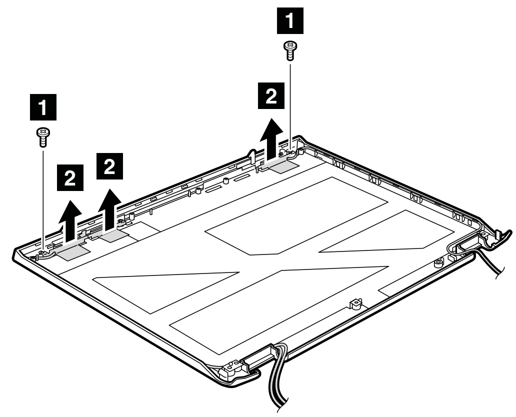
Step	Screw (quantity)	Color	Torque
1	M2 × 3 mm, pan-head, nylon-coated (2)	Silver	0.245 Nm (2.5 kgfcm)

Cable routing: Route the cables as shown in the following figure.



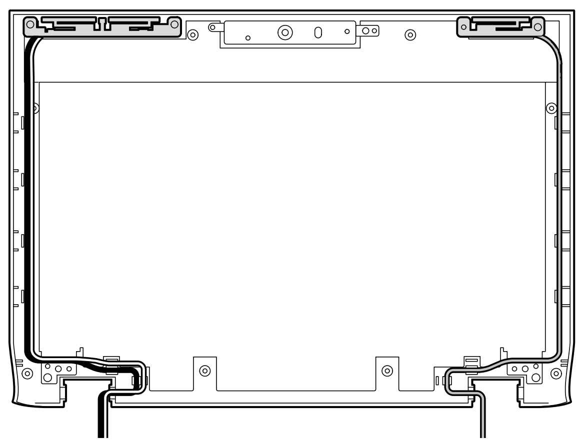
(continued)

For the antennas with three cables



Step	Screw (quantity)	Color	Torque
1	M2 × 3 mm, pan-head, nylon-coated (2)	Silver	0.245 Nm (2.5 kgfcm)

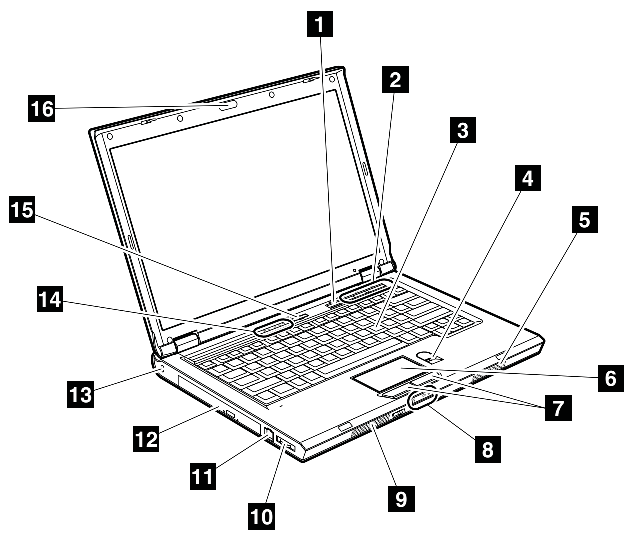
Cable routing: Route the cables as shown in the following figure.



Locations

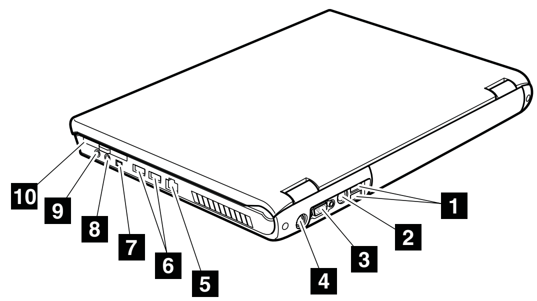
Front view

1	Lenovo Care button
2	Volume control buttons
3	Keyboard
4	Fingerprint reader (for some models)
5	Built-in stereo speaker (right)
6	Touch pad
7	Touch pad buttons
8	System and power status indicators **Note:** For the description of each indicator, see "Status indicators" on page 32.
9	Built-in stereo speaker (left)
10	5-1 Digital Media Reader
11	RJ-11 (modem) connector
12	Optical drive
13	Security keyhole
14	System and power status indicators **Note:** For the description of each indicator, see "Status indicators" on page 32.
15	Power switch
16	Integrated camera (for some models)



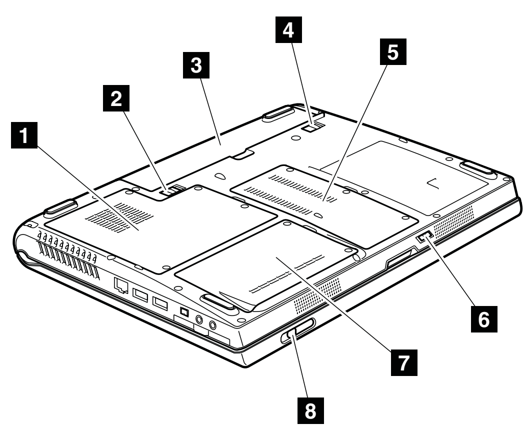
Rear view

1	USB connectors
2	S-Video connector
3	External monitor connector
4	AC power connector
5	RJ-45 (Ethernet) connector
6	USB connectors
7	IEEE1394 connector
8	Microphone jack
9	Stereo headphone jack
10	ExpressCard slot



Bottom view

1	Heat sink assembly slot
2	Battery pack latch
3	Battery pack
4	Battery pack latch
5	Memory card slot
6	Wireless radio switch
7	Hard disk drive slot
8	LCD cover latch



Parts list

- Each FRU is available for all types or models, unless specific types or models are specified.
- FRU with specific models listed and described as xxU (where U is an example of a country designator) should be used for all models ending in U.
- FRU with specific models listed and described as 3Dx (where 3D is an example of a unique configuration) should be used for all of these models, unless specific country or region designator is specified.
- A CRU (customer replaceable unit) is identified by a single asterisk (*) or two asterisks (**) in the CRU ID column. An N in the CRU ID column means the part is not a CRU. A single asterisk (*) means the part is an External CRU; two asterisks (**) means the part is an Internal CRU.

  Lenovo 3000 computers contain the following types of the external CRUs:

  External CRUs (pluggable)
  These CRUs unplug from the computer. Examples of these types of CRUs include an ac adapter, an external keyboard, a mouse, a power cord, a port replicator, a USB device, and an external bay device adapter.

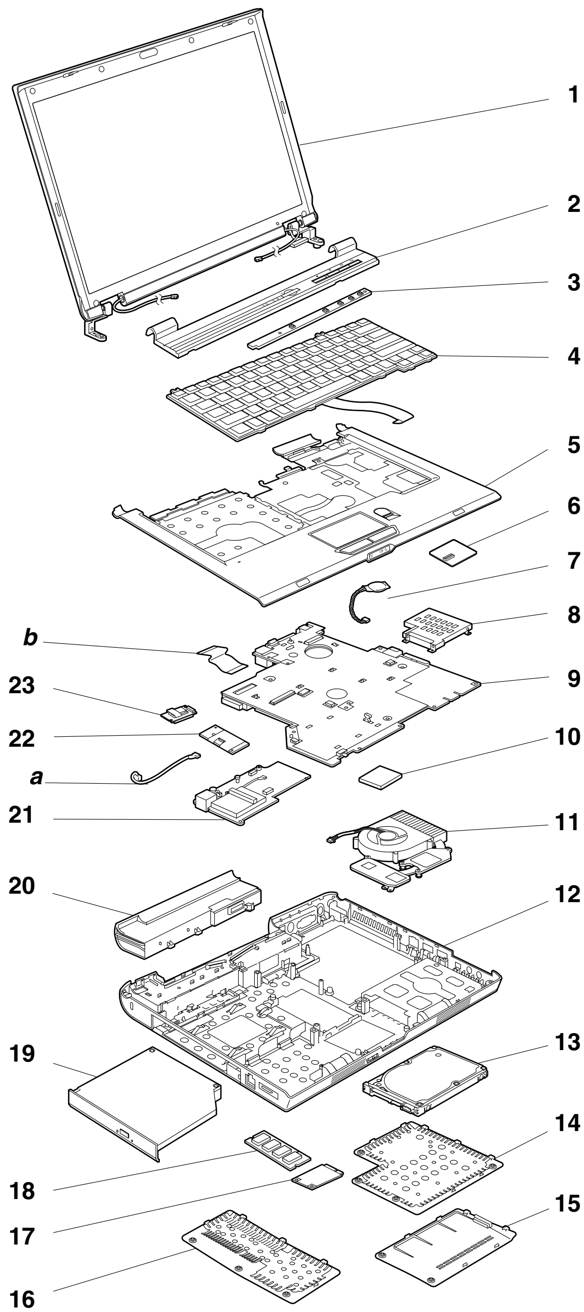
  External CRUs with latches
  These CRUs have a latch to help you to remove and replace the part. Examples of these types of CRUs include a battery pack, a cover such as a memory card slot cover and a hard disk drive slot cover.

  Lenovo 3000 computers contain the following types of the internal CRUs:

  Internal CRUs (located behind an access panel)
  These CRUs are isolated parts within the computer that are concealed by an access panel that is typically secured by either one or two screws. Once the access panel is removed, only the specific CRU is visible. Examples of these types of CRUs include a memory card and a hard disk drive.

  Internal CRUs (located within the product itself)
  These CRUs are accessible only by opening the outer case of the computer. Examples of these CRUs include the parts beneath a cover and they are secured by either one or two screws.
- A RoHS compliant FRU is identified by an R. An N in the RoHS ID column means the part is not a RoHS compliant FRU.
- FRUs marked with **OP** are available as options.

Overall



No.	FRU	FRU no.	RoHS ID	CRU ID
a - *b*	See “Miscellaneous parts” on page 95.			
1	LCD unit (see “LCD FRUs” on page 87.)			
2	Middle cover	41R7530	R	N
3	Function board	41R7531	R	N
4	Keyboard (see “Keyboard” on page 89.)			
5	Keyboard bezel assembly without fingerprint reader • 0687-29x, 2Ax, 46x, 47x, 49x, 4Gx, 4Hx, 4Zx	41R7527	R	N
	Keyboard bezel assembly with fingerprint reader • 0687-27x, 28x, 2Bx, 32x, 48x, 4Ax, 4Bx, 4Cx, 4Dx, 4Ex, 4Jx, 4Kx, 4Lx, 4Mx, 4Nx, 4Px, 4Qx, 4Rx, 4Sx, 4Tx, 4Ux, 4Vx, 4Wx, 4Xx, 4Yx, 52x, 53x, 67x, 68x, 69x, 6Ax, 6Bx, 6Cx, 6Dx, 6Ex, 72x, 73x	41R7528	R	N
6	Fingerprint reader card • 0687-27x, 28x, 2Bx, 32x, 48x, 4Ax, 4Bx, 4Cx, 4Dx, 4Ex, 4Jx, 4Kx, 4Lx, 4Mx, 4Nx, 4Px, 4Qx, 4Rx, 4Sx, 4Tx, 4Ux, 4Vx, 4Wx, 4Xx, 4Yx, 52x, 53x, 67x, 68x, 69x, 6Ax, 6Bx, 6Cx, 6Dx, 6Ex, 72x, 73x	41R7610	R	N
7	Backup battery	41R7611	R	N
8	ExpressCard slot	41W6378	R	N
9	System board assembly, 14W integrated • 0687-27x, 28x, 29x, 2Ax, 46x, 47x, 48x, 49x, 4Ax, 4Bx, 4Cx, 4Dx, 4Gx, 4Hx, 4Jx, 4Kx, 4Px, 4Qx, 4Rx, 4Tx, 4Ux, 52x, 53x, 69x, 6Ax, 6Bx, 6Cx, 6Dx	41R7514	R	N
	System board assembly, 14W discrete 128 • 0687-2Bx, 4Ex, 4Lx, 4Sx, 6Ex	41R7515	R	N
	System board assembly, 14W discrete 256 • 0687-32x, 4Mx, 4Nx, 4Vx, 4Wx, 4Xx, 4Yx, 67x, 68x, 72x, 73x	41R7516	R	N

(continued)

No.	FRU	FRU no.	RoHS ID	CRU ID
10	CPU assembly, Intel Celeron M processor 540 (1.86 GHz) • 0687-29x, 46x, 47x, 4Gx, 4Hx, 4Qx, 4Ux	41R7621	R	N
	CPU assembly, Intel Core 2 Duo processor T7100 (1.83 GHz) • 0687-27x, 28x, 2Ax, 2Bx, 48x, 49x, 4Ax, 4Bx, 4Cx, 4Dx, 4Jx, 4Kx, 4Px, 4Rx, 4Sx, 4Tx, 4Zx, 6Ax, 6Bx, 6Cx, 6Dx	42W7654	R	N
	CPU assembly, Intel Core 2 Duo processor T7300 (2.0 GHz) • 0687-32x, 4Ex, 4Lx, 52x, 53x, 69x, 6Ex	42W7655	R	N
	CPU assembly, Intel Core 2 Duo processor T7500 (2.2 GHz) • 0687-4Mx, 4Nx, 4Vx, 4Wx, 4Xx, 4Yx, 67x, 68x, 72x, 73x	42W7656	R	N
11	Heat sink assembly, integrated • 0687-27x, 28x, 29x, 2Ax, 46x, 47x, 48x, 49x, 4Ax, 4Bx, 4Cx, 4Dx, 4Gx, 4Hx, 4Jx, 4Kx, 4Px, 4Qx, 4Rx, 4Tx, 4Ux, 52x, 53x, 69x, 6Ax, 6Bx, 6Cx, 6Dx	41R7532	R	N
	Heat sink assembly, discrete • 0687-2Bx, 32x, 4Ex, 4Lx, 4Mx, 4Nx, 4Sx, 4Vx, 4Wx, 4Xx, 4Yx, 67x, 68x, 6Ex, 72x, 73x	41R7533	R	N
12	Base cover assembly	41R7529	R	N
13	SATA hard disk drive, 60 GB, 9.5 mm, 5,400 rpm • 0687-46x			
	Hitachi	41R7703	R	**
	Fujitsu	41R7704	R	**
	Seagate	42T1851	R	**
	SATA hard disk drive, 80 GB, 9.5 mm, 5,400 rpm • 0687-27x, 29x, 2Ax, 47x, 49x, 4Ax, 4Bx, 4Gx, 4Hx, 4Px, 4Qx, 4Ux, 4Zx, 6Ax, 6Bx			
	Hitachi	41R7706	R	**
	Fujitsu	41R7707	R	**
	Seagate	42T1852	R	**
	SATA hard disk drive, 120 GB, 9.5 mm, 5,400 rpm • 0687-2Bx, 32x, 48x, 4Cx, 4Dx, 4Ex, 4Jx, 4Kx, 4Lx, 4Rx, 4Tx, 52x, 53x, 69x, 6Cx, 6Dx, 6Ex			
	Hitachi	41R7709	R	**
	Fujitsu	41R7710	R	**
	Seagate	42T1853	R	**
	SATA hard disk drive, 160 GB, 9.5 mm, 5,400 rpm • 0687-28x, 4Mx, 4Nx, 4Sx, 4Vx, 4Wx, 4Xx, 4Yx, 67x, 68x, 72x, 73x			
	Hitachi	41R7712	R	**
	Seagate	42T1854	R	**

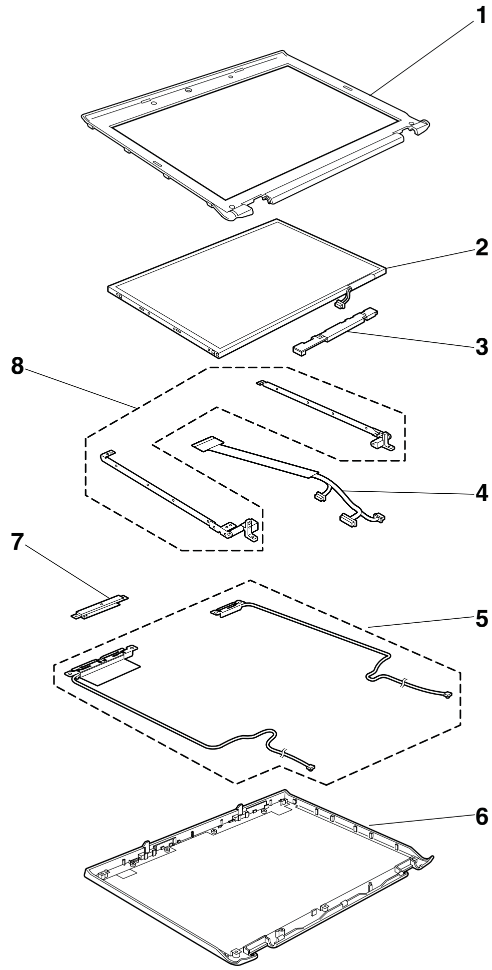
(continued)

No.	FRU	FRU no.	RoHS ID	CRU ID
14	Heat sink assembly slot cover	41R7614	R	*
15	Hard disk drive slot cover	41R7613	R	*
16	DIMM slot cover	41R7612	R	*
17	Intel PRO Wireless 3945ABG Mini-PCI Express Adapter • 0687-27x, 28x, 2Bx, 4Ax, 4Bx, 4Cx, 4Dx, 4Ex, 4Jx, 4Kx, 4Lx, 4Px, 4Qx, 4Rx, 4Tx, 4Vx, 4Wx, 4Xx, 4Yx, 4Zx, 53x			
	xxA, xxB, xxF, xxH, xxL, xxM, xxP, xxQ, xxS, xxU, xxV, xxY	42T0853	R	**
	xxK	42T0857	R	**
	xxG, xxT, xxR (802.11b/g)	42T0861	R	**
	Broadcom 802.11bg WLAN PCI-E Mini Card • 0687-29x, 2Ax, 46x, 47x, 4Gx, 4Hx, 4Ux			
	xxF, xxU, xxV	42T0819	R	**
	xxE, xxJ, xxT	42T0821	R	**
	xxA, xxB, xxG, xxH, xxK, xxL, xxM, xxP, xxQ, xxR, xxS, xxY	42T0823	R	**
	Lenovo 11a/b/g/n Wireless LAN Mini-PCI Express Adapter • 0687-48x, 49x, 67x, 68x, 69x, 6Ax, 6Bx, 6Cx, 6Dx, 6Ex, 72x, 73x			
	xxA, xxB, xxF, xxH, xxL, xxM, xxP, xxQ, xxS, xxU	42T0843	R	**
	xxT, xxR (802.11b/g/n)	42T0851	R	**
	Intel Wireless WiFi Link 4965AGN • 0687-32x, 4Mx, 4Nx, 4Sx, 52x			
	xxA, xxB, xxF, xxH, xxL, xxM, xxP, xxS, xxU, xxV, xxQ, xxY	42T0865	R	**
	xxG	42T0867	R	**

(continued)

No.	FRU	FRU no.	RoHS ID	CRU ID
18	512-MB DDR2-667 SDRAM SO-DIMM (PC2-5300) card OP • 0687-27x, 28x, 29x, 2Ax, 46x, 47x, 48x, 49x, 4Ax, 4Bx, 4Cx, 4Dx, 4Gx, 4Hx, 4Jx, 4Kx, 4Px, 4Qx, 4Rx, 4Sx, 4Tx, 4Ux, 6Ax, 6Bx, 6Cx, 6Dx	40Y8402	R	**
	1-GB DDR2-667 SDRAM SO-DIMM (PC2-5300) card OP • 0687-2Bx, 32x, 4Ex, 4Lx, 4Zx, 52x, 53x, 69x, 6Ex	40Y8403	R	**
	2-GB DDR2-667 SDRAM SO-DIMM (PC2-5300) card OP • 0687-4Mx, 4Nx, 4Vx, 4Wx, 4Xx, 4Yx, 67x, 68x, 72x, 73x	40Y8404	R	**
19	DVD/CD-RW combo drive assembly, 12.7 mm • 0687-46x, 4Gx			
	HLDS	42T2033	R	**
	Panasonic	42T2041	R	**
	DVD-RAM/RW drive assembly, 12.7 mm • 0687-27x, 28x, 29x, 2Ax, 2Bx, 32x, 47x, 48x, 49x, 4Ax, 4Bx, 4Cx, 4Dx, 4Ex, 4Hx, 4Jx, 4Kx, 4Lx, 4Mx, 4Nx, 4Px, 4Qx, 4Rx, 4Sx, 4Tx, 4Ux, 4Vx, 4Wx, 4Xx, 4Yx, 4Zx, 52x, 53x, 67x, 68x, 69x, 6Ax, 6Bx, 6Cx, 6Dx, 6Ex, 72x, 73x			
	HLDS	42T2035	R	**
	Panasonic	42T2031	R	**
20	Battery pack, Li-ion (6 cell) • 0687-all			
	Sanyo	42T4515	R	*
	LG	42T5237	R	*
21	5-1 Digital Media Reader board	41R7609	R	N
22	Modem daughter card (MDC)	41R5798	R	N
23	*Bluetooth* daughter card (BDC) • 0687-27x, 28x, 32x, 46x, 47x, 48x, 49x, 4Ax, 4Bx, 4Cx, 4Dx, 4Ex, 4Gx, 4Hx, 4Jx, 4Kx, 4Lx, 4Mx, 4Nx, 4Px, 4Qx, 4Rx, 4Sx, 4Tx, 4Ux, 4Vx, 4Wx, 4Xx, 4Yx, 4Zx, 52x, 53x, 67x, 68x, 69x, 6Ax, 6Bx, 6Cx, 6Dx, 6Ex, 72x, 73x	41W1163	R	N
—	Blank bezel for ExpressCard slot and 5-1 Digital Media Reader	42W2200	R	*
—	Label kit	41R7618	R	N

LCD FRUs



14.1-in. WXGA TFT

No.	FRU	FRU no.	RoHS ID	CRU ID
1	LCD front bezel	41R7520	R	N

(continued)

No.	FRU	FRU no.	RoHS ID	CRU ID
2	LCD panel, 14.1-in. WXGA anti-glare • 0687-2Ax, 48x			
	CMO	42T0377	R	N
	LPL	42T0381	R	N
	Samsung	13N7154	R	N
	LCD panel, 14.1-in. WXGA glare • 0687-27x, 28x, 29x, 2Bx, 32x, 46x, 47x, 49x, 4Ax, 4Bx, 4Cx, 4Dx, 4Ex, 4Gx, 4Hx, 4Jx, 4Kx, 4Lx, 4Mx, 4Nx, 4Px, 4Qx, 4Rx, 4Sx, 4Tx, 4Ux, 4Vx, 4Wx, 4Xx, 4Yx, 4Zx, 52x, 53x, 67x, 68x, 69x, 6Ax, 6Bx, 6Cx, 6Dx, 6Ex, 72x, 73x			
	CMO	42T0378	R	N
	LPL	42T0383	R	N
	Samsung	13N7160	R	N
3	Inverter card, 14W			
	YEC	41R7517	R	N
	Darfon	41R7518	R	N
4	LCD cable assembly without a camera • 0687-27x, 29x, 2Ax, 46x, 47x, 49x, 4Gx, 4Hx	41R7522	R	N
	LCD cable assembly with a camera • 0687-28x, 2Bx, 32x, 48x, 4Ax, 4Bx, 4Cx, 4Dx, 4Ex, 4Jx, 4Kx, 4Lx, 4Mx, 4Nx, 4Px, 4Qx, 4Rx, 4Sx, 4Tx, 4Ux, 4Vx, 4Wx, 4Xx, 4Yx, 4Zx, 52x, 53x, 67x, 68x, 69x, 6Ax, 6Bx, 6Cx, 6Dx, 6Ex, 72x, 73x	41R7523	R	N
5	Antenna assembly for three antennas • 0687-32x, 48x, 49x, 4Mx, 4Nx, 4Sx, 52x, 67x, 68x, 69x, 6Ax, 6Bx, 6Cx, 6Dx, 6Ex, 72x, 73x	41R7525	R	N
	Antenna assembly for two antennas • 0687-27x, 28x, 29x, 2Ax, 2Bx, 46x, 47x, 4Ax, 4Bx, 4Cx, 4Dx, 4Ex, 4Gx, 4Hx, 4Jx, 4Kx, 4Lx, 4Px, 4Qx, 4Rx, 4Tx, 4Ux, 4Vx, 4Wx, 4Xx, 4Yx, 4Zx, 53x	41R7526	R	N
6	LCD rear cover	41R7519	R	N
7	Camera • 0687-28x, 2Bx, 32x, 48x, 4Ax, 4Bx, 4Cx, 4Dx, 4Ex, 4Jx, 4Kx, 4Lx, 4Mx, 4Nx, 4Px, 4Qx, 4Rx, 4Sx, 4Tx, 4Ux, 4Vx, 4Wx, 4Xx, 4Yx, 4Zx, 52x, 53x, 67x, 68x, 69x, 6Ax, 6Bx, 6Cx, 6Dx, 6Ex, 72x, 73x	41R7524	R	N
8	Hinges	41R7521	R	N

Keyboard

Language	P/N (NMB)	P/N (Chicony)	RoHS ID	CRU ID
Arabic	42T3353	42T3418	R	N
Belgian	42T3350	42T3415		
Chinese, Traditional	42T3364	42T3429		
Czech	42T3358	42T3423		
Danish	42T3347	42T3412		
Dutch	42T3344	42T3409		
English, U.K.	42T3342	42T3407		
English, U.S.	42T3338	42T3403		
English, U.S. (International, with a Euro symbol)	42T3368	42T3433		
Finnish, Swedish	42T3345	42T3410		
French, Canadian (058)	42T3340	42T3405		
French, Canadian, Acnor	42T3339	42T3404		
French, European	42T3343	42T3408		
German	42T3341	42T3406		
Greek	42T3360	42T3425		
Hebrew	42T3355	42T3420		
Hungarian	42T3359	42T3424		
Iceland	42T3370	—		
Italian	42T3348	42T3413		
Japanese	42T3363	42T3428		
Korean	42T3365	42T3430		
Norwegian	42T3346	42T3411		
Polish	42T3356	42T3421		
Portuguese	42T3352	42T3417		
Portuguese, Brazilian	42T3369	42T3434		
Russian	42T3354	42T3419		
Slovak	42T3362	42T3427		
Slovenian	42T3361	42T3426		
Spanish, European	42T3349	42T3414		
Spanish, Latin American	42T3366	42T3431		
Swiss	42T3351	42T3416		
Thai	42T3367	42T3432		
Turkish	42T3357	42T3422		

Recovery discs

Windows XP Professional CDs

Windows XP Professional is preinstalled as the operating system in the following models:

- 0687-2Cx

Language	P/N	RoHS ID	CRU ID
Arabic	44Y1581	R	*
Chinese, Simplified	N/A		
Chinese, Traditional	44Y1575		
Chinese, Traditional (Hong Kong S.A.R.)	44Y1576		
Czech	44Y1580		
Danish	44Y1570		
Dutch	44Y1573		
English, U.K. with disabled modem and WLAN	44Y1563		
English, U.S. with enabled modem and WLAN	44Y1562		
Finnish	44Y1571		
French	44Y1564		
German	44Y1565		
Greek	44Y1585		
Hebrew, English enabled	44Y1578		
Hungarian	44Y1584		
Italian	44Y1567		
Japanese	44Y1577		
Korean	44Y1586		
Norwegian	44Y1572		
Polish	44Y1579		
Portuguese, Brazilian	44Y1568		
Russian	44Y1582		
Russian, English enabled	44Y1588		
Slovenian	44Y1587		
Spanish	44Y1566		
Swedish	44Y1569		
Turkish	44Y1583		

Recovery discs

Windows Vista Home Premium (32 bit) DVDs

Windows Vista Home Premium is preinstalled as the operating system in the following models:

- 0687-27x, 2Bx, 47x, 48x, 4Ex, 4Lx, 4Rx, 4Sx, 4Zx, 6Ex

Language	P/N	RoHS ID	CRU ID
Bulgarian	44Y0027	R	*
Chinese, Simplified	44Y0004		
Chinese, Traditional	44Y0011		
Chinese, Traditional (Hong Kong S.A.R.)	44Y0014		
Croatian	44Y0028		
Czech	44Y0020		
Danish	44Y0012		
Dutch	44Y0016		
English, (UD) U.K. with disabled modem and WLAN	44Y0001		
English, U.S., U.K. with enabled modem and WLAN	44Y0000		
Finnish	44Y0013		
French	44Y0005		
German	44Y0006		
Greek	44Y0022		
Hebrew	44Y0007		
Hungarian	44Y0023		
Italian	44Y0008		
Japanese	44Y0009		
Korean	44Y0015		
Norwegian	44Y0017		
Polish	44Y0021		
Portuguese	44Y0024		
Portuguese, Brazilian	44Y0003		
Romanian	44Y0029		
Russian	44Y0018		
Russian, English enabled	44Y0002		
Serbian-Latin	44Y0030		
Slovak	44Y0031		
Slovenian	44Y0025		
Spanish	44Y0010		
Swedish	44Y0019		
Turkish	44Y0026		
Ukrainian	44Y0032		

Windows Vista Home Basic (32 bit) DVDs

Windows Vista Home Basic is preinstalled as the operating system in the following models:

- 0687-29x, 2Ax, 46x, 4Ax, 4Cx, 4Gx, 4Jx, 4Px, 4Qx, 53x, 6Ax, 6Cx

Language	P/N	RoHS ID	CRU ID
Chinese, Simplified	44Y0069	R	*
Chinese, Traditional	44Y0076		
Chinese, Traditional (Hong Kong S.A.R.)	44Y0079		
Czech	44Y0085		
Danish	44Y0077		
Dutch	44Y0081		
English, (UD) U.K. with disabled modem and WLAN	44Y0066		
English, U.S., U.K. with enabled modem and WLAN	44Y0065		
Finnish	44Y0078		
French	44Y0070		
German	44Y0071		
Greek	44Y0087		
Hebrew	44Y0072		
Hungarian	44Y0088		
Italian	44Y0073		
Japanese	44Y0074		
Korean	44Y0080		
Norwegian	44Y0082		
Polish	44Y0086		
Portuguese, Brazilian	44Y0068		
Russian	44Y0083		
Russian, English enabled	44Y0067		
Slovenian	44Y0089		
Spanish	44Y0075		
Swedish	44Y0084		
Turkish	44Y0090		

Windows Vista Business (32 bit) DVDs

Windows Vista Business is preinstalled as the operating system in the following models:

- 0687-28x, 32x, 49x, 4Dx, 73x, 4Hx, 4Kx, 4Nx, 4Tx, 4Ux, 4Wx, 4Yx, 52x, 68x, 69x, 6Dx

Language	P/N	RoHS ID	CRU ID
Bulgarian	44Y0059	R	*
Chinese, Simplified	44Y0037		
Chinese, Traditional	44Y0043		
Chinese, Traditional (Hong Kong S.A.R.)	44Y0046		
Croatian	44Y0060		
Czech	44Y0052		
Danish	44Y0044		
Dutch	44Y0048		
English, (UD) U.K. with disabled modem and WLAN	44Y0034		
English, U.S., U.K. with enabled modem and WLAN	44Y0033		
Finnish	44Y0045		
French	44Y0038		
German	44Y0039		
Greek	44Y0054		
Hungarian	44Y0055		
Italian	44Y0040		
Japanese	44Y0041		
Korean	44Y0047		
Norwegian	44Y0049		
Polish	44Y0053		
Portuguese	44Y0056		
Portuguese, Brazilian	44Y0036		
Romanian	44Y0061		
Russian	44Y0050		
Russian, English enabled	44Y0035		
Serbian-Latin	44Y0062		
Slovak	44Y0063		
Slovenian	44Y0057		
Spanish	44Y0042		
Swedish	44Y0051		
Turkish	44Y0058		
Ukrainian	44Y0064		

Windows Vista Ultimate (32 bit) DVDs

Windows Vista Ultimate is preinstalled as the operating system in the following models:

- 0687-72x, 4Mx, 4Vx, 4Xx, 67x

Language	P/N	RoHS ID	CRU ID
Chinese, Simplified	44Y0095	R	*
Chinese, Traditional	44Y0101		
Chinese, Traditional (Hong Kong S.A.R.)	44Y0104		
Czech	44Y0110		
Danish	44Y0102		
Dutch	44Y0106		
English, (UD) U.K. with disabled modem and WLAN	44Y0092		
English, U.S., U.K. with enabled modem and WLAN	44Y0091		
Finnish	44Y0103		
French	44Y0096		
German	44Y0097		
Greek	44Y0112		
Hungarian	44Y0113		
Italian	44Y0098		
Japanese	44Y0099		
Korean	44Y0105		
Norwegian	44Y0107		
Polish	44Y0111		
Portuguese, Brazilian	44Y0094		
Russian	44Y0108		
Russian, English enabled	44Y0093		
Spanish	44Y0100		
Slovenian	44Y0114		
Swedish	44Y0109		
Turkish	44Y0115		

Corel software CDs

Language	P/N	RoHS ID	CRU ID
English, U.S.	41X0440	R	*
French	41X0443		
Japanese	41X0608		
Portuguese, Brazilian	41X0449		
Spanish	41X0446		

AC adapters

FRU	P/N	RoHS ID	CRU ID
2-pin (90 W, 20 V) adapter (models xxE, xxF, xxJ, xxL, xxP, xxS, xxU, xxY) **OP**			
ASTEC	42T5000	R	*
Lite-On	93P5026	R	*
2-pin (65 W, 20 V) adapter (models xxE, xxF, xxJ, xxL, xxP, xxS, xxU, xxY) **OP**			
Delta	92P1155	R	*
Lite-On	92P1159	R	*
ASTEC	92P1214	R	*
3-pin (90 W, 20 V) adapter (models xxA, xxB, xxC, xxG, xxH, xxK, xxM, xxT, xxQ, xxR, xxV) **OP**			
ASTEC	92P1104	R	*
Lite-On	92P1108	R	*
3-pin (65W, 20 V) adapter (models xxA, xxB, xxC, xxG, xxH, xxK, xxM, xxT, xxQ, xxR, xxV) **OP**			
Delta	92P1153	R	*
Lite-On	92P1157	R	*
ASTEC	92P1212	R	*

Miscellaneous parts

FRU	P/N	RoHS ID	CRU ID
Screw kit (including nylon-coated screws): • M2 × 2.5 mm (silver), pan-head (10) • M2 × 3 mm (black), pan-head (21) • M2 × 4 mm (silver), pan-head (6) • M2.5 × 3 mm (silver), wafer-head (2) • M2.5 × 5 mm (silver), pan-head (6) • M2.5 × 6 mm (dark silver), pan-head (19) • M2.5 × 9 mm (dark silver), pan-head (7) • M2.5 × 13 mm (dark silver), pan-head (1) • M3 × 2.8 mm (black), pan-head (4) • Hex stud (2)	41R7617	R	N
System miscellaneous parts: • Bracket, fingerprint reader • Bracket, optical drive • Bracket, hard disk drive • Bracket, touch pad • Rubber foot (4) • Screw cap rubber (6)	41R7615	R	N
Cable miscellaneous parts • MDC cable • Fingerprint reader cable • Function board cable • Touch pad cable • *Bluetooth* cable	41R7616	R	N

Common parts list

Tools

Tool	P/N
Triconnector wrap plug	72X8546
Audio wrap cable	66G5180
USB parallel test cable	05K2580
Screwdriver kit	95F3598
Mini PC tool set	00P7033
1/4" drive spinner handle	1650840
1/4" Sq. to 1/4" hex torx adapter	93F2838
TR7-TR-10 tamper resistant torx bits	00P6967
Removal tool antenna RF connector	08K7159
PCI-Express/USB wrap card	27K9813
CE Utility Diskette for Lenovo 3000 notebooks **Note:** Download the file from the following Web site: `http://www.lenovo.com/spm`	—

Power cords

A Lenovo 3000 power cord for a specific country or region is usually available only in that country or region:

For 2-pin power cords:

Region	P/N (Longwell)	P/N (Volex)	RoHS ID	CRU ID
Argentina	42T5020	42T5105	R	*
Brazil	42T5026	42T5111		
Canada, U.S.	42T5008	42T5093		
Japan	42T5014	42T5099		

For 3-pin power cords:

Region	P/N (Longwell)	P/N (Volex)	RoHS ID	CRU ID
Australia, New Zealand	42T5050	42T5135	R	*
Denmark	42T5041	42T5126		
Europe	42T5029	42T5114		
Hong Kong S.A.R. of China, U.K.	42T5035	42T5120		
India	42T5083	42T5168		
Israel	42T5062	42T5147		
Italy	42T5047	42T5132		
Korea	42T5077	42T5162		
South Africa	42T5056	42T5141		
Switzerland	42T5044	42T5129		
Thailand, Taiwan	42T5004	42T5089		

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(1P) P/N: 42X3552